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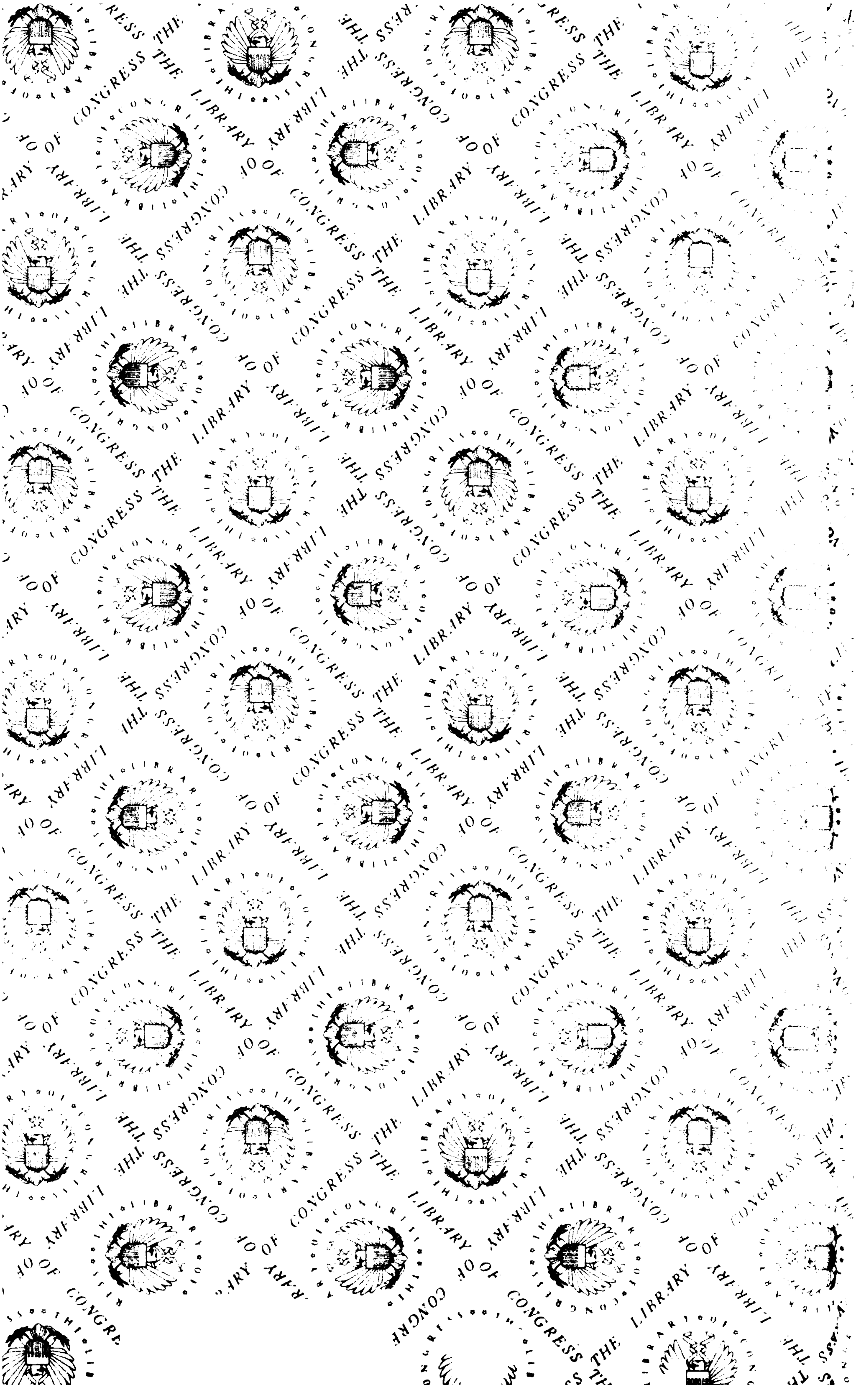

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THE

COUNTRY GENTLEMAN'S MAGAZINE

WITH NINE-FIVE ENGRAVINGS

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HORÆ SYLVANÆ.

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THE

UNTRY GENTLEMEN'S MAGAZINE

JANUARY 1872

THE PRINCE OF WALES.

MID the heartfelt congratulations of a great people, the febrile symptoms of Prince of Wales have happily abated. en gloom was blackening to despair, a ak of light shone through—the dark cloud red round and shewed its silver lining—and hearts of the people, troubled much with ow, thereafter they rejoiced with exceed- great joy.

en years ago, at this, which we regard as the *ive* season of the year, when we are plan- g our holly decorations and Christmas s, trysting our roast beef, and when those can afford it are casting about how best bring comfort to the poor—His Royal hness's father died. The Prince Con- 's memory is dear to the heart of this on. He was a man, who, although he nged to another country, was regarded as pioneer in all works that conduced to the y of the United Kingdom, and of the mag- ent dependencies over which our Queen, his wife, was called upon to rule. Prince ert once did make a remark that was strued in a manner not consonant with minds of Englishmen (and in a way, we eve, which he never intended); but ther or not, like a sensible and good man—ling that constitutional government was t which suited the people among whom was called to live, best—without remark he it alone, on its trial. It has been tried and found wanting. The Prince Consort the credit (even according to the chief of the notorious Seven Points, Mr Scott Russell) of having been the originator of the ideas which are promulgated about technical education, and love all round; brotherhood of man, &c.—ideas which do not seem to be very well understood by those who use the names of great men and thinkers—as a cloak—on the plea of promoting them.

Of course every work or duty undertaken and performed by the Prince Consort was interesting to the nation at large; but more particularly so to our readers was the great zeal he exhibited in advancing the cause of what is designated "improved farming." Prince Albert was among the first to patronize every new invention which he thought calculated to effect a saving of labour in the cultivation of the soil. He held, as our readers are aware, several farms, and was a very successful breeder, especially of pigs, a class of which he particularly named. In the year of his death, as we wrote at the time, "The Royal Agricultural Society of England marked its sense of the great services he had rendered to agricultural science, by electing him its President for the ensuing year, and the honour was all the more marked inasmuch as next year's show is one of an International, and not merely of an English character. On the first occasion the Prince was in the chair, the Council of the Society distinguished itself by the passing of some important resolutions calculated to further the interests of agriculture, and His Royal

Highness very properly, we believe, got the credit of the good work."

We have referred to the Prince Consort and the interest which he took in agriculture, simply to note, that the son is following the father's footsteps in this direction; and being spared, as we sincerely trust he may be, and have every good reason to believe, that he will better his illustrious father's instructions.

Strange coincidence, it may seem to many, that this year the Prince of Wales, whose illness has created such deep anxiety, was elected President of a Royal Agricultural Society—that of the Sister Isle. It will be remembered that the Prince, owing to circumstances, had to appeal to the Committee to alter the date of the exhibition of the Royal Agricultural Society of Ireland, and in order to ensure his presence they readily consented to do so, with a result highly satisfactory to themselves. The Prince of Wales, as we then wrote, "has no intention of being a merely ornamental President, if we may judge from the following letter from Sandringham to the Secretary, Capt. Thornhill:—As his Royal Highness is President this year of the Royal Agricultural Society of Ireland, and will be present at the meeting in August, I write to ask you to furnish me with a list of the various classes, that, if possible, his Royal Highness may exhibit some Southdown sheep from the home farm. Will you also send me a copy of the rules, and a list of subscriptions?—We are glad to see the Prince taking so much interest in agriculture, and we trust that his success at exhibitions may be commensurate with his desire to effect improvement in stock. The influence which one in the position of the Prince of Wales can exert in any field he enters upon, is incalculable, and we look to great good accruing to farming from the hearty manner in which his Royal Highness has taken it up."

The Prince did send to the Royal Irish Show, which he attended in person, a Southdown ram, and a pen of shearling ewes—for the first he received a high commendation, and a first prize for the latter. He did more than this; he attended the dinner and made an admirable speech, the advice in which we sincerely trust will be laid to heart by Irish landlords generally. The remarks of the Prince of Wales to which we refer are:—

> I feel sure that if all those men, gentlemen and landlords, who very often find some difficulty in leaving England, but who have large interests and large estates in the country, would contrive to come more often here (hear, hear, and loud cheers), that they would do great good in the country. (Cheers.) I feel sure that they are interested in coming over, and I am certain that they are desirous also that their intercourse with their tenantry and others round them, shall be beneficial in every respect. (Hear, hear.) I may just allude in passing, to the great improvement that has been made in buildings and the cottages of the poor; still, I believe that improvement has not been made as wide as is necessary for the well-being of the humbler classes. If the humbler classes were well lodged, cleanliness and many other benefits will result. (Hear, hear.) Perhaps you will allow me to speak on this matter, because I have had some slight experience, having a small estate of my own, in the management of which I have found the importance of building fresh cottages for the poor, and the immense advantage that step has been to all concerned. (Hear hear.)

The Prince of Wales early found out in his career as a breeder, that there is no Royal road to success at Cattle Shows. Nothing but hard work and brains, as in the case of learning, can raise a man to the top of the tree as an exhibitor of prize animals. The Prince was frequently beaten, but, undismayed, again and again he renewed the struggle, until he became comparatively successful, both at Birmingham and Smithfield. He noticed, on every opportunity, and minutely, the defects in his own stock, and strove to remedy them; and in future years we have no doubt he will follow the same laudable practice, and by so doing greatly contribute to the prosperity of the "back bone of the realm"—agriculture.

It was not alone in stock, that His Royal Highness took interest. At Guildford, he manifested much pleasure in inspecting the grand display of roots that were exhibited on the various stands, noticeably, some from his own farm, at Messrs Carter's tent; root-husbandry, the Prince is well aware, being the foundation of good cattle rearing.

At our time of writing, the suspense is past. A great relief has come to the nation which, in the course of nature, the e of Wales will rule. The grief pro- l by fear for him was not of that sur- kind which finds relief in condolent ssions. Radicals and Republicans of ddest dye have shewn their sympathy pping their howling; and *blasé* theatres shut their doors. It seems that the was of that nature which could win no rt out of words, but caused tears at fountain to freeze. Sympathy for his ed mother—for the memory of his , who, just a decade ago, passed into the land—for his beloved wife and children, een mixed up with that felt about the illness of the Heir-Apparent to the Throne. The thoughts of the nation at this crisis in the history of the Royal Family, can best be expressed in the words of the Poet Laureate, in his Dedication to the Queen:—

> May you rule us long.
> And leave us rulers of your blood
> As noble, to the latest day;
> May children of our children say,
> She wrought her people lasting good.

And the wish of the country is, that the "fierce white light that beats upon a throne" shall expose no stain upon the name and fame of Albert-Edward.

WEIGHTS AND MEASURES.

ELLEY, the Poet, wrote that "nought may endure but mutability," and para- al as the expression appears, it is never- s true, for on all sides we see incessant e.

s is in accordance with the inevitable law gress, which has ever been in existence, ill be.

this great law may be traced every varia- nature and in man. The history of is but the record of their progress. who have benefited by the opera- of this great law, are bound to facilitate tension to others. That such has the case we know, and this was elo- y pointed out by Dean Gregory, in le lecture in St Paul's Cathedral, a few go.

subject of his address was, "Are we than our fathers?"—and the question swered in the affirmative.

ould indeed be an interesting task to he progress which has taken place in rsuit, the toils, the aims, the pleasures of it is our duty, as it is our privilege, to cle; but it is sufficient to say that the of to-day is very far in advance of t of yesterday.

The same energy distinguishes both, the same patience under difficulties. It is the happy lot of the farmer to observe Nature's changes—her decay, reproduction, and consequent progress.

Is it not, then, his especial duty to aid in bringing about any scheme likely to prove a benefit to himself and others, to aid in the operations of the law of progress?

It is usual at political meetings and at Farmers' Clubs to speak very complacently, and assert that this country, even in an age of progress, is the leader in the world's march onward, and it is true that outwardly, in many respects, this appears to be the case. Our railway system, our financial institutions, our home and foreign commerce, all entitle us to lay claim to high rank, and it is perhaps no small evidence of our title to such claim, that under no slight difficulties has our position been won.

We are and have been labouring under many disadvantages, arising mainly from the non-removal of encumbrances which have and do retard our progress.

Our remarks are intended at present to apply equally to the farming and mercantile communities, although it will be our duty subsequently to address the former more particularly, and we do not hesitate to say that our present system—if system it may be called—of Weights and Measures does retard our progress as a nation. If ever a people were oppressed by the remains of a barbaric age, we most certainly are in this respect.

The question has been agitated again and again, and yet we are not one step in advance.

In an age and in a land where, as it were, Land's End and John o'Groats are brought within speaking distance, we are no better off in the respect alluded to than when villages, but a few miles apart, were unknown lands. The "wondrous wire" conveys words of sympathy and of affection, of business and of pleasure, throughout the length and breadth of the land, and yet we are unable to compare prices of our products or of other merchandise, without abstruse calculations which in our busy, bustling life we have scarcely time to make. It is possible that some may say, "Let well alone" (possible, did we say?—it is a sad fact), but such are those who would have been content with the bad roads, with the poor farming, the slow waggons, the limited commerce of our ancestors. Railways have succeeded bad roads and carts, and science has added to our agriculture. Steamships and telegraphy, combined with free trade, have enhanced our commerce, and yet all might be still more increased, could we but secure a uniform system of weights and measures.

It is a curious circumstance, but nevertheless it is true, that the nations most behind in the march of progress are affected with the same diversities as we labour under. India, benighted India, groans beneath them. China, Japan, Russia, South America, all possess this "man of the sea," who clings with pertinacity to the past, hampers business, and retards progress.

Every British merchant when trading in those countries loses thereby, and consequently the consumers here do—and the natives lose also; for each tries to make much of the diversity.

The system in use in the United States is, like their decimal coinage, simplicity itself, and prevails from Lake Superior to Texas, from the Atlantic to the Pacific Ocean.

In this highly favoured land, a man knows not what or how much he is buying, should his requirements exist in a town a few miles away. If a merchant order a cargo of Indian corn or wheat to be shipped from America, or from the Continent of Europe to Bristol, he receives different account-sales than those from Liverpool; and if perchance, to suit the markets, a portion is sent by rail or canal to one or more inland towns, he is puzzled and confused with the different standards used at each. And the American shipper is more puzzled—he is lost in a labyrinth. Indian corn is one thing, wheat is another.

To any one conversant with commercial operations, this "confusion worse confounded" is inexpressibly annoying, and many have been, and are, the anxious longings for evidence of progress by the adoption of a uniform standard thoughout the country.

During last session of Parliament, the metric system was under consideration and abandoned. Is there no other? Why not make the good old imperial quarter the standard throughout the kingdom? Or the cwt., as we have wheat now in the Trade and Navigation Accounts? Why not decide on something? Uniformity of weights and measures would bring countless benefits in its train—it would save time, it would encourage business, it would prevent confusion, it would simplify transactions, and it would be a saving to producers, because the Trade calculate on such diversities, and trade on them. We may return to this subject, and then particularly shew to farmers the disadvantages under which they must labour so long as progress is hindered by the disgraceful position of the weights and measures in use at the present time. Change to any other system would be evidence of advance, of real stability, for "nought may endure but *the* mutability which adds to progress."

TENURE OF LAND IN IRELAND.

ANY have been the speeches, discussions, and articles respecting the vexed question as to the tenure of in Ireland. We almost fear to name bject, feeling that our readers, and not sonably, may prefer to hear or read no of the matter; more especially since ut fair to hope for beneficial results he late measures to redress the evils to land in Ireland is heir to.

have always most emphatically con- ed the agrarian outrages which have oc- l, and which still occur in the sister isle. ve looked on all such deeds with feel- of the utmost abhorrence, and have d to see men of position and standing, *seemingly* excuse the perpetration of liabolical acts by the slightest evidence npathy. A lecture some time ago de- l before the Law Students' Debating y of Ireland, by Mr John B. Falconer, on the "Brehon Laws," appears to some light on the causes which tend duce this state of things, which in d seems normal, although they are, for- ly, abnormal in all other countries. The y before whom it was delivered has on ll the names of many distinguished ers of the legal profession, and the ce was composed of men of the great- telligence. All seem to have been im- with an earnest desire to elucidate the which, for ages, have produced agita- and to remove all such by peaceable tion.

re is much ignorance respecting the t history of Ireland, even among Irish- Burke, aware of the existence of much literature in MS.S., deposited in s libraries here and on the Continent, f its importance, recommended the Government to investigate it, but no- vas done until Vallencey brought several tions into notice, in his celebrated "Collectanea de Rebus Hibernicis," when, by the influence of members of the Royal Irish Academy, a Royal Commission was appointed, in 1852, to inquire into the matter. The result, so far, has been the publication of a translation of the "Senchus Mor," which "forms a portion of the old Celtic Laws, usually called the Brehon Laws, from the titles of the judges by whom they were administered."

"We cannot," said Mr Falconer, in his address, "too highly estimate the possession and value of an accurate translation of these laws, for in them we possess the true key to the social history and distinctive character of our people." Mr Falconer is right—the laws of a country are one of the truest indices of the character of a people, a character which is not always to be safely traced in their songs or in their ordinary literature.

These Brehon Laws reveal the state of society in Ireland at a period long anterior to the first Norman settlements there, a state of society, simple, patriarchal and chiefly pastoral, and yet "complex when compared with the barbarous state of the nations of the neighbouring countries."

Municipal freedom was the prevailing feature in Roman, as that of individual liberty was in Saxon jurisprudence; while in the Celtic laws alluded to, it was, that not the individual, but the nation, "so to say, had the proprietary right to the land"—and this is said "to be the source whence springs the desire for what is termed fixity of tenure."

The feeling that the land was not owned by the chief or individual, save as trustee for his fellowmen, had been engrafted into the minds of Irishmen by the operation of laws in existence before the Christian era.

Nor is this law as to the proprietorship of land a novel or peculiar one, for Mr Maine, one of the most learned writers on antient law, allows that *joint*, not separate ownership, was the really archaic institution. Hindustan possesses a form of ownership in exact accordance with this. In Russia, until very lately, it existed; while in Servia, Croatia, and in Austrian Sclavonia, the villagers are still brotherhoods of men, at once co-owners and kinsmen.

Under such a system, Ireland, all history tells us, flourished. Her schools were famous, and peace and prosperity prevailed throughout the land. Irishmen were esteemed for learning and piety throughout Europe, and it was not until the Norman invasion that discord appeared. Nominally, the Brehon laws were supplanted by the Feudal, in 1172. The Norman barons who had been longest settled in the country became as Irish, if not more so, than those more to the manner born. Dispute followed dispute. It was impossible to erase the memory of the old institutions. In the third year of James I., all passed away, and now not a vestige remains, save in the hearts of th people. And can we wonder that a "syste of laws could hold sway over a nation f 1600 years without leaving its trace, eve long after it had ceased to exist?" W believe that Mr Gladstone drew largely o the facts brought to light by the translatio which formed the subject of Mr Falconer address, in his most exhaustive speech on th Irish Land question, and that Mr Brigh too, was fully cognizant of their importance

Let us then be just, even while condem ing lawlessness. Let us endeavour by a means in our power to govern Ireland i accordance—as far as the new civilizati under which we live will permit—with Iri ideas, and then we can look forward the "happiness, the prosperity, the honou and the unity of Ireland, and the conseque tranquility of the common Empire."

GOOD FARMING AND ITS RESULTS.

NOW that the days of *mere* "ploughing and sowing" are numbered with the things of the past, and progressive agriculture has become a commercial and scientific pursuit, the principles and appliances which regulate and conduct it to a successful issue are of the first consideration thoroughly to understand. Necessarily, with the passing away of the days of "ploughing and sowing," so have the notions and systems, with their accompaniments. But whether the vast stimulus and impetus which agriculture has received within the last few years, in common with other branches of industry, is due to the spread of intelligence, the development of the sciences, or the force of circumstances produced by the change in our commercial and political economy, or a combination of them, is a point which we shall leave to be settled by the fine distinctions of moral and political economists. The question arising from these considerations is, "how to produce the greatest possible results at the least possible cost?"—keeping alwa in view the increasing fertility of the soil.

Much has been said, and a variety opinions have been expressed, upon the si of the occupation best suited for the prop development of scientific agriculture. T result of these inquiries is, that large occ pations, *i.e*, farms of 500 acres and upward are the most profitable to cultivate. It generally conceded that the cost of steam c tivation, with all the necessary appendages thrashing, dressing, grinding, cutting a pulping roots, &c., would be too much to l out upon a smaller holding, and that hiri steam power for them would be more ec nomical; and just in the same ratio, the larg the occupation the more profitable its app cation becomes.

It is scarcely necessary to observe that la should be farmed with as few restricti clauses as to its management, as it is at necessary for the due protection of its righ and the safety and interests both of landlo nant. This is a point which is much lerstood. It is impossible for a tenant to the land which he occupies by a large liture of capital judiciously applied; and impossible to expect a large expendi- hen a tenant is hampered with re- e clauses. A large-hearted and liberal rd, and a judicious, energetic, and prac- nant will do more to promote the in- of agriculture than all the codes and n Christendom. Both combined are thropists in the real sense of the term, the one giving the material, and the other the intelligence and capital necessary for developing its natural resources, while mankind at large are benefited by the results. By the unity of the two, more labour is provided for the working man, and a larger amount of bread and meat for the people in general. Industry in its various branches is promoted, and happiness and contentment spread themselves around; and last, but not least, pauperism and crime decrease, and a solid foundation is laid for civilization and Christianity.

POTATO JUDGING.

IERE is no esculent upon which we depend so much for food, as the po- Although the great Cobbett cursed it, raced a lot of the "ills that flesh is o," to its pernicious influence, and, gh, since the time that he wrote against l praised up his Indian corn, it has us ruinously, we still grow it more nore, while we leave the Indian corn the cold. We are far from saying that npossible to raise Indian corn in many of our country. We believe it is prac- to do so, under some conditions, rofit to the cultivator, and to the beau- of the country; and that before long ll see its cone-like golden honeycomb shining in the fields. But the potato will supplanted by it at our tables, though riety and excellence of the dishes that made from Indian corn are great.

potato, therefore, being a root so sally appreciated, it is of great im- ce that in cultivation we should have st in shape, in flavour, in mealiness, cness, and absence of "offal," that we t. It is next to, if not altogether, im- le to obtain all these qualities com- but we should judge the tubers so give prizes to those which have most We have often thought and said e present system of judging potatoes is far from satisfactory. We have maintained that to test them thoroughly, the judges ought to have them boiled, and we are glad to observe that this opinion, expressed very many years ago, is beginning to gain ground. That such a test as to flavour and condition will shortly become more common than it is, we have not the slightest doubt.

A very interesting and sensible communication on the subject has just been made by "A Successful Competitor" at potato exhibitions, to one of our provincial contemporaries. The present system of judging, this writer, (who has been a winner, and who cannot therefore be accused of speaking from resentment at being passed over), says is very imperfect even when it is not absolutely bad. He expresses his surprise that often-times there is a want of attention on the part of judges to very important points both outwardly and inwardly, in the case of two sorts of good potatoes whose skins and whose flesh differ; yellow-fleshed potatoes are often as mealy, as pleasantly flavoured, larger sized, and better shaped than some whites, and yet the latter bear off the palm with no other recommendation than the whiteness of the meat in its raw state.

With the following remarks of the correspondent we so heartily concur, that we give them *in extenso*:—

Now, I think it is an utter mistake to judge entirely by cutting, because the quality cannot be absolutely arrived at by colour, though, generally speaking, the white-fleshed may be the mealiest. Yet, take an instance. Where will you find a finer favourite potato than a good pink-eye, and at the same time where will you find a yellower-fleshed potato of any sort at all worthy to be counted for quality? I am not sure but it is a mistake to cut at all in judging. At all events, fineness and good growth should take the precedence. I do not mean that absolute size should carry by any means, unless, of course, where the largest or heaviest are specially defined as wanted. Neither would I say that a potato known to be coarse (and judges should be well acquainted with all the sorts generally offered in competition, otherwise they are very liable to error, and they should have some fixed principle in judging) should carry. I humbly think that potato judging should be done in something like the following :—1st, There must be average size, or above it, and equalness in size of the different potatoes in the same lot; 2d, Fineness of appearance and growth; 3d, Quality, by knowledge of the sorts without cutting; and 4th, When two or more lots are so equal in the first three requirements, then apply the test of cutting as the nearest criterion possible in a competition of unboiled potatoes. *But boiling and tasting is the only true criterion* where it is possible.

"Where it is possible"—says the correspondent. In this age of portable stoves, there is no impossibility in having competing potatoes boiled, even at shows in the most out-of-the-way country places.

INFLUENCE OF IMPLEMENTS ON AGRICULTURE.

AMONG the different branches of human enterprise, unbounded as they now are, there are few which, directly or indirectly, affect mankind more than agriculture. In the primitive forms of life, the food for human sustenance was obtained by hunting and fishing, this was succeeded by the pastoral or patriarchal era, when shepherds guarded their flocks by night, and tended them during the day. Then, as population increased, and the supply of food became an absolute necessity of existence, men were driven to till the soil, and seek, in the garden or field, the bread which was necessary to sustain life. Agriculture in its original state was confined to cereal products, and the culture of roots was unknown. It is only, indeed, within a very recent period, scarcely out of the recollection of people now living, that turnips or potatoes were introduced into the field from the garden; and it is only within the last quarter of a century or so that the development of this most important branch of human industry has been brought to such an extent as to form a large item in the resources of the nation.

The implements used in tilling the soil by our grandfathers were of a very rude description, and could hardly be said to form any improvement upon those used by the Romans. As, however, the demand for meat grew up alongside of our extended mercantile progress, and the wages of labour became greater, then the enterprise of the country blacksmith got converted into the large agricultural engineering establishments which are now dotted over the length and breadth of the land.

Without our improved ploughs, grubbers, sowing and reaping machines, agriculture would be comparatively valueless: and the other forces which have materially aided in the progress, artificial manures and feeding stuffs, would be of little avail. It would be idle to fancy that we have attained the *ne plus ultra* of perfection in agricultural engineering; on the contrary, we may safely predict that, as the demand for food presses upon the resources of the land, men of enterprise and of mechanical genius will contrive to invent machines compared with which those at present in use will be considered rude and barbaric.

One of the greatest of antient agriculturists on being asked in what does the successful cultivation of the soil consist, replied, good ploughing; the second, good ploughing; and the third, good ploughing. Doubtless, the care now taken of preserving the manure of the farm, although sufficient care is no

l yet, much being allowed to go
nd the employment of artificial
does much to restore the phos-
and other ingredients abstracted
soil by the constant system of
—for which fallowing even could
pensate—but unless the soil, after
be properly disintegrated and pre-
receive the seed, the advantages
noted would be all but thrown

ow nearly half a-century ago since
ttempts were made to apply more
the cultivation of the soil—one
uld perform the work in a new and
manner, and at a less cost or out-
ice it to say, that the long and ex-
trials of steam cultivation have now
u fait accompli—not a vision in the
dle theorists, but a grand reality in
uction of human sustenance. By
f this all but omnipotent agent, famine is all but an impossibility, and it only requires its extensive introduction and application to render the resources of the land practically unlimited. The Fowlers, the Howards, and the Fiskens, will have their names handed down to posterity, not only on account of their rare enterprise and ingenuity, but as great benefactors of the human family. In a short time, a farmer will be reckoned either a good or bad one, according-as he avails himself or not of the advantages of steam cultivation. Already, societies are being formed in various parts of the country for developing this grand invention; and as many of our readers have met at the Agricultural Hall, and held intercourse together about improvements in the agricultural machinery exhibited, we hope every opportunity has been taken of keeping the steam plough in view in their discussions. Let this year form an epoch in the annals of agriculture by its more general introduction.

THE VALUE OF FAT STOCK EXHIBITIONS.

T is the great commodity which
our countrymen want to make them
nd happy; and this, we say, notwith-
Bumble, who insisted that meat was
ing that spoiled the subordination
bjects over which he had control.
y man is an angry man." This is an
all have heard. It is an opinion in
e of Shakspeare's characters shared,
liked not another—because the
d "a lean and hungry look," and
earances about men are acknow-
langerous. Republicans would be
ere the flesh-pots better filled. The
with all their anxious desire to get
land where they were oppressed,
h, leaving, they *spoiled*, had no
issed their butcher-meat than they
the Pharaohic diet to which they
accustomed. Even the lean kine,
sumption of the fat was the means of the Israelite migration into the fertile land watered by the Nile, would have pleased them better than the manna which came down from above.

John Bull and his descendants have the same taste for good fare. "Roast beef" is considered by foreigners to be almost a prerogative of the Britishers. In no other country, we believe, is it used to such an extent. It is supposed to be the "bone and sinew" of the kingdom. It occasioned, we are informed, the downfall of Napoleon the Great; though it may well be doubted whether in the Peninsular War, our soldiers had more of it at times than the "frog-eating Frenchmen."

Well, this indispensable article, this large item in our consumptive expenses, is failing us sadly. We are not a corn-growing country, after the fashion of continental ones, or of America. In European countries across the Channel, climate is better, labour is cheaper, soil is not rented so high; in America, land may be said to be almost of inexhaustible richness, and where competition comes in strongly, labour-saving machines are available at cheap-rates. Cattle, therefore, notwithstanding all that can be written in favour of corn-growing, are undoubtedly the sort of husbandry, along with sheep and poultry, to which the attention of our farmers should be directed. We want the "roast beef of old England," especially at this season of the year, and we wish it at a lower rate than that for which we are at present obtaining it. Ninepence per lb. for the live carcases in the market makes it a hard job for the butcher to get much out of the best pieces at 1s. 2d. or 1s. 3d. per lb.; and the worst pieces are necessarily dear to those who can afford to purchase them at all. And matters would be much worse, as we pointed out last week, had we not such a large supply from abroad. Six millions sterling, in round numbers, for live stock, is more than we can well afford to pay as a nation; it is less, however, than we ought to expend, if we consider the prices we pay individually. Except for these £6,000,000 so laid out upon the foreigner, our beef and mutton would be immensely higher than it is.

These fat stock shows are productive of good in this way—that they encourage early maturity, and provoke a skill which secures a large amount of beef and mutton at an early age. It is doubtful, perhaps, whether the extra weights obtained in all cases of show-beasts repay the outlay; but then such feeding, carried out at a less extravagant extent, vastly improves the general breed. Since fat stock exhibitions were first instituted, the size of cattle has very largely increased, and their flesh-forming properties greatly improved, for, along with skilful feeding, we must have careful and skilful breeding also. They are also useful as centres for spreading information regarding stock throughout the length and breadth of the land. The farmer from the Land's End can here meet and converse with the farmer from John O'Groats; those from the Midland counties can exchange ideas with those from the North; and all have an opportunity of noting that which may have been wrong in their present method, and of taking advantage of what may seem better in their neighbour's method.

Great as the benefit of fat stock exhibitions have been, however, we still want something more than their stimulus to produce sufficient food for our teeming population. Meat we must have, and the foreign sources of supply we can draw upon besides being comparatively limited, are expensive on account of transit and dangerous on account of disease. In fact, the meat problem is the great one of the age, and the man that solves it will be as great a benefactor to his country, as the one that raised up two blades of grass instead of one.

AN EXAMPLE TO BE FOLLOWED.

THE tenants on Lord Fife's estates are greatly to be congratulated. They live under a good landlord, one who has given every facility for improvement; one who has imposed no harsh or oppressive condition; one who, without waiting for legislation, last year, of his own free accord, conceded to his tenantry the right of killing hares and rabbits; and they have the assurance of his immediate successor, Lord Macduff, that the same principles which guided his father's conduct towards the farmers on his possessions, shall rule his. Few tenants rest under a like satisfaction.

The occasion which called forth the statements upon which the foregoing remarks are based, was the celebration of the coming of age of Lord Macduff, the only direct heir extensive estates of the Earl of Fife. the districts of the north over which Fife holds sway, there was great re- amongst the tenantry; bonfires , banquets were partaken of; " the real ain dew," as we are informed by the papers, being, at all of them, in plen- supply; and the bagpipes droned and out their merriest tunes. " Nothing his sort of entertainment," it may be on all estates at a coming-of-age time. thies for the tenantry are liberally ex- l by the owners of the soil, and ex- ns of attachment lavishly uttered by cupiers, while yet there is no heart on side." This is true, but there is evi- of the *reality* of the good-will on des in these gatherings in honour of ing Macduff. There was no necessity making a mere display of liberality -management. In him, it may be said the manner born," for those who went him have all treated their tenantry in l spirit. As one of the speakers re- l his hearers :—" When, as often hap- in former years, the crops in this glen destroyed or failed to ripen, when from r's produce there was neither seed nor it is well remembered yet how his ners brought seed-corn to us from across n. And then, again, more recently, a similar misfortune happened to our- the whole of the Fife tenantry in strict were generously presented with discount on paying their rents. And but very lately, we, in common with her tenants on the property received, d, the liberty of shooting hares and on our farms."

with no little feeling of pleasure that ote the following remarks from the of Lord Macduff with reference to lationships which he desires to exist n himself and the tenantry, over in the ordinary course of nature, he the superior. He said :—

men, I do not deceive myself as to the mean- he greetings I have received from this great g. I know full well that they are due to no deeds of my own, for I have still to prove that I am in any way worthy of them; but they are indeed a kindly welcome to me at a time which the world has agreed to consider an important epoch of a man's life. (Cheers.) Above and beyond that they contain much more. They seem to me to convey both an encouragement and a warning, for they testify to the very happy relations which have always existed on these estates between landlord and tenant. (Cheers.) No one can be more sensible of this than I am, and I need not assure you that the lesson this day teaches will not be lost upon me. (Applause.) You all know, gentlemen, that since my father succeeded to the title, the estates have been consolidated, and an immense deal done towards their improvement. (Applause.) Indeed, so much has been done, that comparatively little remains undone. But apart altogether from mere physical improvement, I know, and you know, gentlemen, that it has always been the motto of my family to " Live and let live." In the principle of that motto, and in the liberal course of dealing on which my father and those who have gone before him have acted, I cordially and entirely concur. (Loud cheers.) I believe that it is the true interest of landlord and tenant to cultivate mutual relations by fair and liberal dealing—(applause)—each believing and knowing that they have duties and responsibilities one to the other —(renewed applause)—and I think that each should feel that his real and true interest is to cultivate and maintain that cordial understanding which ought always to subsist between those so nearly connected. (Cheers.) And here perhaps you will allow me to say that I entirely approve of a step taken last summer, in regard to which I was consulted at the time, and in which, then, as now, I fully concurred—I mean the concession made to the tenantry with respect to ground game. (Loud cheers.) I think that was a step in the right direction, and the manner in which the concession has been received has been exceedingly pleasant to my father and myself. (Applause.) And as I look at the inaction of the past session, from whatever cause that inaction arose, I feel glad that so timely a step was taken without waiting for legislation.

Well spoken; and, still better, the words the young Viscount uttered in proposing the toast of the tenantry. He declared :—

My father and myself are proud of the happy connexion which unites us to a body of men whom I believe to be unequalled for intelligence and enterprise. (Hear, hear.) I have travelled a good deal, as has been said to-night; but nowhere have I seen such farming as on many of the farms of my friends —and I hope they will allow me to call them friends —(cheers)—on these estates. And I must compliment the tenantry on their success in the rearing of cattle, more especially the cattle of the polled breed. Gentlemen, it is the earnest desire of my father and myself that this mutual confidence may increase from year to year. (Applause.) What we wish is that old faces and old names may ever be connected with the same holdings. (Renewed cheering.) I look upon every tenant of my father as my personal friend, and I take the deepest interest in the minutest things that are conducive to their welfare. (Applause.)

Were Lord Macduff's sentiments to animate other young noblemen of large possessions, we should soon see a wealthier proprietary, a more thriving and contented tenantry, and a larger supply of corn and cattle for the general community.

A FIRKIN OF CORK BUTTER.

UNDER the above heading, a writer in the *Daily Telegraph* gives us some interesting information relative to the process of inspection which Cork butter, intended for export, is subject to on the other side the Channel. He first of all bestows a word of praise on the Committee of Merchants of the Cork Butter Exchange, consisting "of a body of private individuals who, recognizing the truth of the dictum that honesty is the best, as well as, in the long run, the best paying policy, have by the sole influence of their own social standing and credit, directed an important branch of trade into a well-defined channel, and established a guarantee for the quality of a commodity which is accepted without hestitation in every part of the civilized world."

They wished to establish, he says, a recognized system of management which should secure manufacture, uniformity in weighing, a rigorous test of quality, and brands which should guarantee to the purchaser the exact quality for which he had paid. From that time to the present they have continued their beneficent action under a system which has had the effect of not only greatly improving the quality, but of rendering fraud difficult by the almost certainty of detection.

The butter trade of Cork, leaving out of consideration the fluctuations due to the character of the seasons—hot and dry, or wet and cold summers being equally unfavourable to production—may be described as steadily progressive, the number of packages branded being 105,809 in 1770, from which year the records of the Committee of Merchants commence, and reaching 410,952 in 1870. The highest figures ever reached were in 1859, when 431,462 firkins were classified; and in 1860 when the numbers were 416,212. This sudden rise from 370,645 firkins in 1856, and the subsequent decline, in 1862, to 362,477 firkins, was occasioned by the sudden demand created in Australia, consequent on the discovery of gold, and by that demand afterwards being met by Australian production. The increase, too, was not altogether in the production of Irish butter; for the demand for export was then so urgent in Cork, and the prices were so high, that the producers of other countries actually sent their butter to Cork to be classified and branded by the Committee of Merchants, and thus to be rendered current as Irish butter. With subsequent fluctuations consequent on the seasons, the production has steadily increased, and, with the spread of sounder agricultural knowledge, a much greater development may be confidently anticipated.

The Cork Butter Exchange is a building of no great architectural pretensions, in the north-west suburb of the city. It covers something over 1 acre of ground, and consists of a paved area, divided into five compartments, with a committee room above stairs, a sales room, and the secretary's office. A market is held every day; all the firkins sent in for sale being deposited in one or other of the compartments of the grand area. The number of firkins on sale by each of the butter merchants—who are the agents of the producers—being known, these gentlemen and the butter exporters, or buyers, go together into the sales room, and in the course of the fifteen minutes, from 10.45 to 11 o'clock in the morning, bidding and bargain-o on between the buyers and sellers; ighest price obtained for the largest ity of each quality of butter being ted and quoted by the Committee of hants as the ruling price of the day. In roceeding, the interest of the producer efully watched. The exporters have no in determining the quoted price, and if it ought by the butter merchants that the ngs are below the actual value, no price oted, and the butter is held over to the market. In the meantime, all is activity e area below. The executive staff of the et consists of five inspectors, and nu- us clerks, coopers, scratchers, and brand- To prevent the possibility of any col- between the inspectors, who decide uality of every firkin of butter sent to arket, and the merchants and produ- a ballot at ten o'clock every morning es the compartment which each inspec- all take for that day. When the opera- of inspection begins, the coopers take e head of each firkin. Long experi- enables them, by sounding and inspec- of the staves and head, to determine er it is of the regulation weight of 150 If there is any appearance of the firkin g been soaked to add to its weight, or e staves or head of being abnormally , the hoops are knocked off, the butter ed out on a slab, and the firkin under- the crucial test of the weights and . Supposing the cask tester is satis- the borer is thrust to the bottom of kin, and a cylinder of butter the whole of the package is submitted to the in- ors. These gentlemen, whose functions imilar to those of the wine and tea s of our great commercial ports, are en- by long experience to determine the cter and value of every sample with a ity that is somewhat marvellous to the iated, and with an accuracy which is ently proved by the fact that their de- is rarely called into question by the cer, who may be standing by to watch oceeding.

modus operandi is first to run the ler of butter so closely under the nose that lubrication of the nasal organ of the operator seems inevitable, then to run a groove along it with the thumb, and dexterously whipping out a nick on the extremity of the thumb nail, to appeal to the sense of taste. The first proceeding enables the inspector to test by the unfailing evidence of the aroma, that the sample is free from the slightest taint or mixture; the second, by developing the "grain," that it has been well and properly made; and the third, that it has been cured properly for the class to which it purports to belong. What is called "ordinary cure," is the butter prepared for exportation, by incorporating 5 pints of salt with the firkin of 70 lb. This is distinguished by being packed in dark coloured firkins with dark hoops. "Mild cure" butter is that intended for the home trade, and for immediate consumption in England and Scotland, and for this, 3 pints of salt per firkin is the maximum quantity that ought to be used in the manufacture. The classification of each description admits of six qualities; but practically, only three are employed. The Irish butter producers are not more honest than other people; but their skill in falsification has not reached the point of the clever artists of our great towns, who produce a first-class article out of one-third butter, one-third water, and one-third grease, of more or less disgusting origin. Their clumsy attempts at fraud seldom go beyond putting in more than the proper quantity of salt, or attempting to deceive the cask inspector by packing the butter in a firkin which would tare more than the recognized 15 lb. In the first case, butter which would probably have been classed as first or second, gets relegated to the fourth or fifth class; and in the second case, the result is merely to give the extra trouble of weighing the firkin, so that it may be marked with the proper tare.

Assuming no attempt at fraud, and the decision of the inspector to be unquestioned, his judgment of first, second, or third, as the case may be, is recorded on the firkin by the "scratcher," who scratches with a wood-cutting instrument one, two, or three marks so deeply into the bilge staves as to be indelible, except intentionally for the purposes of fraud. The marked firkin is then rolled to the scales, where it is carefully weighed, and the result is chalked on it in the shape of the lbs. weight to gross above ½ cwt.—for that, being a constant quantity, need not be recorded—and the tare of the firkin. Two clerks in a little shed close by the scales record the weight and quality of each firkin, one keeping permanent books of reference for the Committee of Merchants, by which every firkin can be traced to the producer and inspector, and any complaint of the consumer can be at once attended to. After weighing, the firkin is rolled to the brander, who impresses the brand of the Committee of Merchants. This consists of the word "Cork," in large letters but separated by a slight interval in the middle, in which, in smaller letters and at right angles, is impressed in full, the words "first," "second," and "third," or whatever the quality may be, while beneath are the letters "C. M.," standing for "Committee of Merchants," and a letter and numeral which indicate, by means of the books of reference, the inspector and date of inspection. The weight of the butter and the tare of the cask are next branded in near to the Committee of Merchants' brand, which is impressed over the scratch marks to make their erasure more difficult. This second branding is a very dexterous piece of business, and deserves mention for a piece of economy, which is worth knowing by all who have so to mark casks or cases of merchandise. Instead of the whole of the numerals, which would require continually changing to form the ever varying figures required, the brander has only one brand iron bearing the figures 13, and by cleverly manipulating this at different angles to the wood, he succeeds in producing, quite as rapidly as with the full number of brands, figures which, if not perfectly symmetrical, are quite unmistakeable, and, for all practical purposes, leave nothing to be desired.

The process of inspection and branding is carried on in the presence of the producer or his agent, the butter merchant, and may be challenged at any stage. If it is thought the butter is deserving of a better classification, the producer or his agent has the power of appeal. In that case the lot is put on one side, and, after the inspection of the day is completed, a notice is given of re-inspection. The butter is then again submitted to two other inspectors, whose decisions are given separately. If, as is almost universally the case, their judgment upholds that originally given, the firkins are branded, and the matter ends.

THE AGRICULTURAL LABOURER.

By Mr J. J. Mechi.

OUR agricultural power is composed of landowners, farmers, and labourers combined, just as steam power is formed of coal, water, and machinery. Each part is connected with, and dependent on, the other for a profitable result. The three interests are governed by the law of supply and demand, which no legislative act can regulate or control, although the attempt has often been made and failed. It is not at all difficult to perceive that, of the three interests, the landowner has the vantage ground in this densely populated country, for the land never had any children, while both farmers and labourers have very large families, wanting land and wanting employment. On my farm, the labourers have an average of five children each, including two who have none; and I have also five children. This question of mutual dependence is quite independent of the pecuniary arrangements between the parties, which, of course, must be like other business transactions, and governed by circumstances. Farmers and labourers must both gain a living, and the rent of land must be subservient to that end.

It is very wrong to impute to any class, as a class, wrong doing. Of course, individual deviations from rectitude are to be found in every class of society, but I look upon landowners, tenants, and labourers as actuated by ordinary and proper feelings, each trying to do the best he can for himself, which is a sound commercial or business sentiment. Circumstances, and opinions founded on any changes in these circumstances, may and do greatly alter the conditions that govern British agriculture. Manufactures, commerce, and population have been so increased and stimulated by the new power of steam, that agriculture must come out of its old rut, and enter on a new and more rapid route; therefore landowners, farmers, and labourers, must all change and improve, and take their part in the general advance. We were 15,000,000 in 1800, we are now 32,000,000. The acres are numerically the same, but are being improved, and farming must be still further improved by less prejudices in favour of old customs on the part of the landowner, his tenants, and the labourer. There must be an improved mental and physical condition of the labourer; with the value of his labour we have nothing to do, that must follow the law of supply and demand, but there are certain things that should be done for the labourer that he has no power to do for himself. I mean education and decent house accommodation. What I mean by education is reading, writing, and ordinary arithmetic—these are the means by which he can acquire knowledge if he desires so to do, but without them his mind must remain a comparative blank. Education is the basis on which knowledge and power are founded. The Scotch, thanks to John Knox, are in this respect in advance of us, hence the employment of Scotch managers, bailiffs, stewards, gardeners, &c., almost everywhere out of Scotland.

I am strongly in favour of permitting the juveniles at an early age to take some part in agricultural practice. The little urchins (although like monkeys, sometimes troublesome) assist their older brothers in collecting and preparing food for stock, cleaning out the henhouse, looking up the eggs, &c. The donkey and donkey-cart are their delight; they soon learn to harness, guide, and feed him, and so pass on to leading or riding the big horses, who soon become accustomed to and obedient to their juvenile commands. They are handy in helping their parents or relatives in picking twitch, stone picking, gleaning, pea picking. Where would they be during the absence of their parents, when not at school? Of course, a certain portion of schooling is most desirable, and there is plenty of time for that during the short days and long evenings, when it is unfit for them to take part in agricultural work. I am told that in the rural districts of the United States, many of their schools are only used about half the year. In fact, I consider it most important for the agricultural labourer that he should acquire in early life the necessary technical knowledge, for there is a great deal to be learned on agricultural matters.

As regards the housing of the agricultural labourer, a great reform is needed. Many of us remember that the most strenuous efforts of both landowners and farmers were formerly directed to preventing the erection of cottages on their property or farms; so that, in cases of non-employment, illness, or old age, the charge for his maintenance should fall on somebody else, in some other town or parish. Never mind how far he had to walk to and from his work—never mind how much his morals and health were undermined by close packing and indecent propinquity—the great aim of each parish was to shuffle its labourers on to or into another parish, and wasted money in litigation for this object.

Near a town, scarcely a cottage could be found on certain estates, because the town should bear the poor-rate. But since the wise law of uniting parishes has come into operation, the opportunities for such unworthy practices have ceased, and the result is, as we see, a sudden appreciation of the necessity for improved cottage accommodation. This may be of the plainest description—so long as the space and rooms are sufficient. Of course, wealthy landowners, who desire their property to be ornamental as well as useful, can indulge their desire, but cannot expect to be paid for it out of the scanty means of the labourer—£4 a-year is hereabout considered the proper rent, or even £4, 10s., with at least 20 rods of ground—therefore it is quite clear that each cottage should not cost more in building than £60 to £80, if interest for money is expected.

It is quite clear that there must be a constant migration of our agricultural population, either to other climes or to other occupations. The acres have no children, and can absorb no increase of population, unless they are greatly improved, and also, above all, converted from grass land to arable. This has taken place for many years, for, four centuries ago, it was stated that pasture had then decreased, but still was as 20 to 1 of arable, now it is about 1 for 1, or 22,000,000 of acres.

Fortunately steam-power has so enriched this country, and so multiplied its wants, that vast numbers of our agricultural surplus labourers, male and female, find their way into our towns and factories. As the labourer becomes better educated and informed, that migration will increase, for his local attachments will no longer withstand the claims of an improved condition. Our agricultural females find much employment in needlework, for the clothing contractors in towns and cities. Pea picking for the London market has been a source of considerable profit to the labourer's family; fruit and seed growing also add to their means. For all this we are indebted to that mighty power, steam, which has shortened time and space between man and man, and has permitted and encouraged an enormous increase of town population.

Those who study economy should learn from the agricultural labourer. On an average, his family consists of himself, wife, and three children. His wages average at most £36 per annum; his house rent (no taxes) costs £4 per year; so that five persons have to be clothed and fed for £6, 8s. each per annum, or 2s. 6d. each per week. How is this disposed of? Bread and flour, puddings, aided by vegetables, and a small portion of cheese, butter, and meat form the labourer's food, and no doubt are the most effective economical arrangement that could be made. The consumption of meat is at most 1 ounce per head per day, and that generally fat pork. In my prosperity and in my adversity, I often used to say that I could live independently on £50 per annum—not as Mr Mechi, but as John Brown or Tom Jones, in a good fustian suit, my own gardener and librarian, luxuriating in one or two daily penny papers and a pipe of mild tobacco. Surely I could do this when I see so many hard workers with large families living on less than £36 per annum. Skimmed milk is sold about here at 1d. per quart when once skimmed, but only a halfpenny if twice skimmed; but there are so few cows kept that it is difficult to get any. It is a great boon to a labourer's family of small children.

One great drawback is the loss of time that a labourer must occasionally suffer from want of employment, especially the odd men who are only availed of at busy periods. Here we see the necessity for, and national advantage of allotments or large gardens. Reasonable masters, with a fair proportion of kindly feeling, looking at the labourer as something more than a mere piece of machinery, but rather as a tool to be kept bright and in good working condition, mentally and physically, have no difficulty in selecting useful labourers who are content to continue their services, which is very much to the master's comfort and advantage. Labourers with violent tempers and changeable and unsettled habits, can only expect to be employed just when the farmer may happen to want them.

In the west, south, and east of England we know little, if anything, of the mops, or yearly hirings. It is no uncommon thing to find labourers who, although only weekly servants, have worked all their lives on one farm, be gradually replaced by their sons. I don't quite know whether the Scotch farmer

;es his men at the yearly hirings, or ıer it arises from a desire of change on ›art of the young educated Scotch farm ırer. Their food seems economical and :ious—oatmeal and milk, with fish when it ›e got. I don't hear much about meat.

in other matters, so it is in agriculture, and intelligent masters make good and igent servants. We are none of us per- ›n. Piece-work is the great boon to master and man in agriculture, as it manufactures. To keep a man on day because you don't like to see him earn :y, is a narrow-minded and unprofitable .ke; and, to say the least of it, it is most r to estimate fields at a measure much er than the actual ploughable quantity, der to diminish the labourer's earnings. e seen too much of this done.

bourers have a great aversion to enter ıted union house. Boards of guardians this, and sometimes take advantage of ıs causing to respectable labourers great privations. Irregular or loose families, that are always ready to go into the house, generally get the most readily out-door relief, because the guardians know that it costs very much more to keep them in the house than to allow them out of it. When a respectable labourer is past work, 3s. to 4s. and a couple of 4-lb. loaves weekly is all that he can expect, to pay rent and feed and clothe himself and his wife. I am always sorry to see the good old couples separated when they are obliged to go into the union house. But these things must be, for it will not answer to make the union house too attractive.

It is a profitable and kindly act to employ very old men, who are past severe work, to attend to the fences, roads, and other easy matters, a few hours daily, at 2s. 6d. a week, provided the guardians will permit it. An industrious, well-conducted labourer, who has laboured away most of his life on a farm, is entitled to such consideration, for he dislikes compulsory idleness.

THE EDUCATION OF AGRICULTURAL CHILDREN.

By Sir Harry Mainwaring.[*]

HIS subject is limited. I have no intention or wish to go into the sub- ›f education in general, which is, indeed, my friend Mr George Slater calls a le one." It is a subject on which we been inundated with pamphlets and ›helmed with speeches; a subject which ars to be causing great contention now, which will give infinite trouble to the generation; a subject which has been ıssed by almost every one, and by the of the day, Mr *Punch*, who says:—

ll you who write and talk on education,
nd all such themes of doughty disputation,
'or mercy's sake do study condensation
)f sense in fewest words—consolidation.

I will take this great writer's advice, and condense the subject so far as I am able, for it is not really so wide a one as Mr Slater seems to think it is, and may be consolidated into these few words: "Train up children in the way they should go;" or, in other words, "Give children an education such as will materially help them, and push them on in the profession which they adopt, or which is adopted for them."

DESIRABILITY OF AGRICULTURAL INSTRUCTION.

Our clergy are educated for their profession; so are soldiers, sailors, and others; why, then, are not agricultural children educated for their profession? Why is the one and the same system of education pursued in all our parochial schools? Whether it be a school at a seafaring place, like Birkenhead, or a mechanics' school, as at Crewe, or a school at a manufacturing place like Staleybridge, or a school at a purely agricultural place like Over Peover, the system of education is the same. It is no matter of surprise, therefore, that, with some few exceptions, perhaps, children educated at parochial schools in agricultural districts should be found to be grossly ignorant of the profession which they adopt. I will explain shortly why this is so. First, however, let me say that I am opposed to all compulsory education of children after they attain the age of eight years. I think that the State should not dictate to parents as to the management of their children after that age. In these days, when labour is so scarce and costly, children in agricultural districts are of great use to farmers, and of great advantage to their parents. In addition to this, I do not think that children should be kept at school after they are eleven years old. I never yet knew a good farmer or a good cheesemaker who was kept at school after that age. If they remain any longer, boys are afraid of pulling off their coats and dirtying their hands, and all want to become excisemen or railway clerks; and girls wish to become milliners, or something else, according to a comprehensive speech, lately delivered at Manchester. I consider this part of the subject to worthy of the consideration of this chamber of agriculture, and all other chambers of agriculture and commerce. And now let me explain why the one and the same system of education is pursued at all parochial schools in the county. Perhaps some few gentlemen now present may recollect the formation of the Poor Law unions in this county. A commissioner was sent down from the London Board with stereotyped orders, and maps; he cared nothing about counties, or towns, or hundreds, or parishes; he squared us into unions, according to orders. We urged that as our poor-rate only reached 2s. in the pound, we did not require the same law as in Buckinghamshire, where the rates were 16s. in the pound; we said that Gilbert unions would suffice; we asked him not to mix up small townships with large towns. All in vain. He mixed us up altogether and called us unions, because we never united, are not united now, and never shall be united, except by law. Precisely the same thing is now done by the Board of Education. They send down examiners and inspectors, with orders to carry out one system of education; and all children, whether cotton weavers, or sailors, or mechanics, or farmers, are to be educated in the way ordered by them, and in no other way. In our agricultural district we asked that our children might be taught something useful, and something to help them on in farm life. All in vain. They are now taught things which can in no way profit them.

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[*] ead before the Cheshire Chamber of Agri- e.

THE PRESENT STATE OF EDUCATION IN PAROCHIAL SCHOOLS.

Let us for a moment look at the book of education for candidates into training schools, that is, for masters of parochial schools. The book contains "questions proposed to students in training schools and teachers in elementary schools," Christmas, 1870. Pages 21, 22, 23, 24, and 25, contain questions on religion and the Catechism:—these are given up, they are no longer wanted. Then follow some questions in arithmetic, and then on grammar and composition. At page 30, section 6, the student is required to re-write in prose, simply and intelligibly, the following passage:—

> Woods that wave o'er Delphi's steep,
> Isles that crown the Egean deep,
> Fields that cool Ilissus laves,
> Or where Mæander's amber waves
> In lingering labyrinths creep.

It is the most consummate nonsense I ever read. He is then required to explain the words, "many twinkling feet" "incense breathing," "azure," "to hurtle," and to comment on Gray's ode:—

> Modred, whose magic song
> Made huge Plinlimmon bow his cloud-topped head.

What on earth has Plinlimmon to do with Cheshire households? At page 33, he is required to describe the struggle with the

the reign of Ethelred II., and the
between France and England in the
Henry I.; at page 34, to give a short
of the changes in the constitution in
d of the Plantagenets; and at page
following question :—"The union
and and Ireland—how was it ac-
hed? Give the terms of the union."
st be a joke of course, if the august
Education can be supposed to be

These are some few of the very
uestions which are put to male can-
first year. What the questions for
tes of the second year and for female
es are, I know not; probably they
e ridiculous. Such appears to be the
n of masters for agricultural districts.
"Ought not some alteration to be
eedily in this system?" Of course
ers are taught, so do they teach.
xious to learn the state and progress
ation in the county, I made some
s, and received the following sketch,
on of which I have extracted :—
l schools in the agricultural districts
hire have been visited. The boys
und, generally speaking, to have been
structed in things which could be of
antage to them; but they were very
t on subjects important to them to

The following were some of the
ns put to them :—Are you intending
a farmer?—Yes. Can you measure
r a road, or a tree?—No. Can you
farm?—No. Can you read the two-
-No. How many bricks would be
d to build a pigstye 7 feet 6 inches
eet.—Don't know. How many tiles
be required to drain an acre of land
ains being 24 feet apart?—Don't

What counties border Cheshire?—
know. What are the principal rivers
eshire?—Don't know. Name the
towns in Cheshire.—Cannot. Is Lon-
the north or south of England?—Don't

Where do coals come from?—The
. Have you ever walked the boundary
r parish, and then mapped it?—No.
here any books on farming in your
l?—No. What is the watershed of
Cheshire, east or west?—Don't know. Does the brook run east or west?—Don't know. Do you know the meaning of a Christian man's oath?—No. Have you read the thirty-ninth article of religion?—No. Other questions were asked with similar results. The masters appeared to be all energetic men, knowing what the boys ought to learn, and willing to teach them if they had time; but they are obliged to devote all their school hours to cramming the boys to be ready for the Government inspector, and all their spare time in cramming themselves, so as to pass their examination for certificates.

SUGGESTIONS FOR THE IMPROVEMENT OF AGRICULTURAL EDUCATION.

Such appears to be the system of education carried out in the agricultural districts of Cheshire, with one exception—the excellent grammar school at Sandbach. Happily, this school is free from inspectors, therefore the boys are admirably instructed by the present head master and assistant masters. They learn agricultural chemistry and mensuration in all its branches, which includes measuring of timber; mapping forms a part of the regular system of education, and there will soon be a surveying class. Unfortunately, the trustees of the school have no power, under their deed, to supply books or maps. I need not trouble you with any more extracts from this report, but will ask you how can this failure in education in our agricultural districts be remedied, particularly as regards boys above eight years of age. Three suggestions have been made:—1. That agricultural schools, if they may be so called, should be established in the county, for boys from eight to eleven years of age. 2. That this Chamber should, with other Chambers, intercede with the Board of Education, and request them to give a more suitable education to boys, who are to follow farming. I must say that I have small hope of inducing the Board to alter their present system; there is no elasticity in the mind of a Board taught to walk on one road, they totally disbelieve in the possibility of another. Let us try, however, and see what can be done. 3. That the trustees of all parochial schools in our agricultural districts should supply the schools with maps, with books on farming, and with newspapers. I am a trustee of several such schools, and I purpose, at the next meeting of the trustees, to propose that books on agriculture, and other useful works, should be supplied from the school funds. Recollect, gentlemen, that it is our duty to educate children for, and to help them on in, the profession which they adopt. Let us try, therefore, to do so; and if we fail the blame will not be on our shoulders.

Our Pasture Grasses.

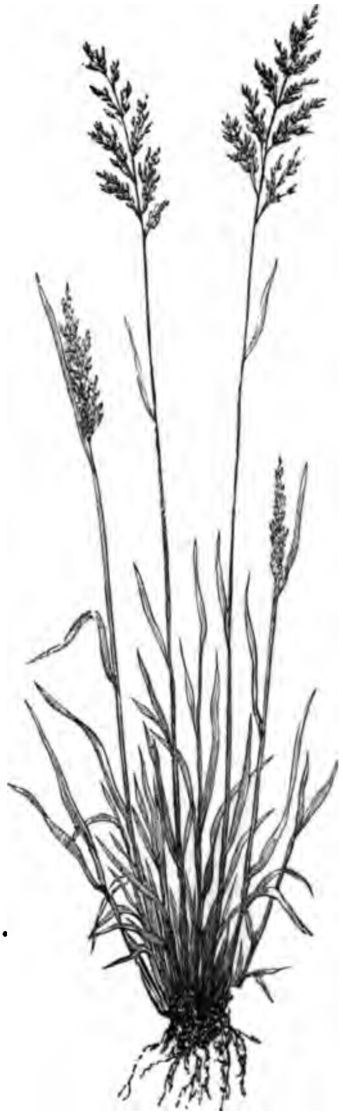
HOLCUS LANATUS (LINNÆUS) FIBROUS ROOTED SOFT GRASS, OR YORKSHIRE FOG.

SYNONYMS—*Gramen miliaceum*, or millet grass, of Lobel, 1570. *Gramen lanatum*, of Dalechamp, 1587. *Gramen miliaceum vulgare*, or common millet grass, of Parkinson, 1640. *Gramen pratense paniculatum molle*, of Bauchin, 1650. *Gramen miliaceum paniculatum molle*, of Ray, 1660. *Aira foliis pubescentibus*, of Linnæus, in his "Flora Suecia," 1755. Also known by the additional English names of meadow soft grass, cock's-tail grass, velvet grass, white grass, white soft grass, Yorkshire whites, and Yorkshire white grass.

ROOT perennial, fibrous and tufted; plant also tufted in growth, being thickly furnished with root foliage, and erect flower or seed bearing stems, which are cylindrical, almost smooth or very slightly downy, furnished with four or five joints each, which in some instances are smooth, and in others covered with inverted soft downy hairs; but the plants are destitute of those barren leafy stems which are one of the distinguishing characteristics of the H. mollis. Leaves of a dullish light green colour, broad, flat, and covered on both surfaces with short delicate downy hairs, the upper one on the stem much shorter than its inflated sheath, and furnished at their junction with an obtuse membraneous ligule, while the lower ones are longer than their sheaths. Inflorescence in compound panicles, which are triangularly spread when flowering, but much more contracted in their earlier and later stages, frequently purplish or greenish pink in colour; erect at first, but becoming slightly curved or bent towards the point, when the seed is ripening. Branches usually in alternate pairs, and covered with minute hairs. Spikelets drooping, and consisting of two hairy-stalked florets, of which the upper is smallest, barren, and minutely awned; while the lower is perfect and awnless, each being contained within a hairy membraneous calyx of two glumes, that are about equal in length; the upper and broadest being of an oblong form, tipped with a minute bristle, hairy on the keel and upper part of the inner margins, and furnished with a greenish rib on each side, while the lower is destitute of ribs, somewhat crescent shaped, and hairy as in the upper. In the upper floret, which is set upon a longish smooth foot stalk, the outer palea has a minute dorsal awn, about half its own length, which is inserted a little below the summit, and when ripe it becomes curved and concealed within the calyx. The foot stalk of the lower floret is also smooth, the outer and inner paleæ are about equal in length, the former is about half the length of the calyx, obscurely five ribbed, bluntish at the summit, and hairy at the base; the latter is also bluntish pointed, membraneous, and with delicately fringed margins; while, together, they form the hardish polished coating of the mature seed. Flowers in the beginning of July, and ripens its seed in from two to three weeks thereafter. This is easily distinguished from the only other common species, H. mollis, by the absence of creeping roots and upright leafy stems, as well as by the awns being unprotruded and invisible unless minutely examined.

NATURAL DISTRIBUTION.

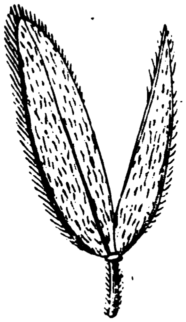
Abundant in cultivated fields, as well as in natural pastures, throughout Britain, at altitudes under 1500 feet, and occasionally found as high as 2000 feet in sheltered situations, but it is most prevalent in upland light dry lands and two or three year old pastures, attaining to its greatest luxuriance in soils of a light peaty nature. It is also common in all countries of Europe, and in northern Asia, south of the Arctic Circle. Although not unfrequent now in the cultivated districts of North America, where it is termed velvet grass, it has never been found there in a truly wild state, and is therefore held to have been introduced from Europe. Nor is it found anywhere in the southern hemisphere except where its seeds have evidently been imported along with other European grasses.



Holcus lanatus, reduced in size, shewing hab t of growth.

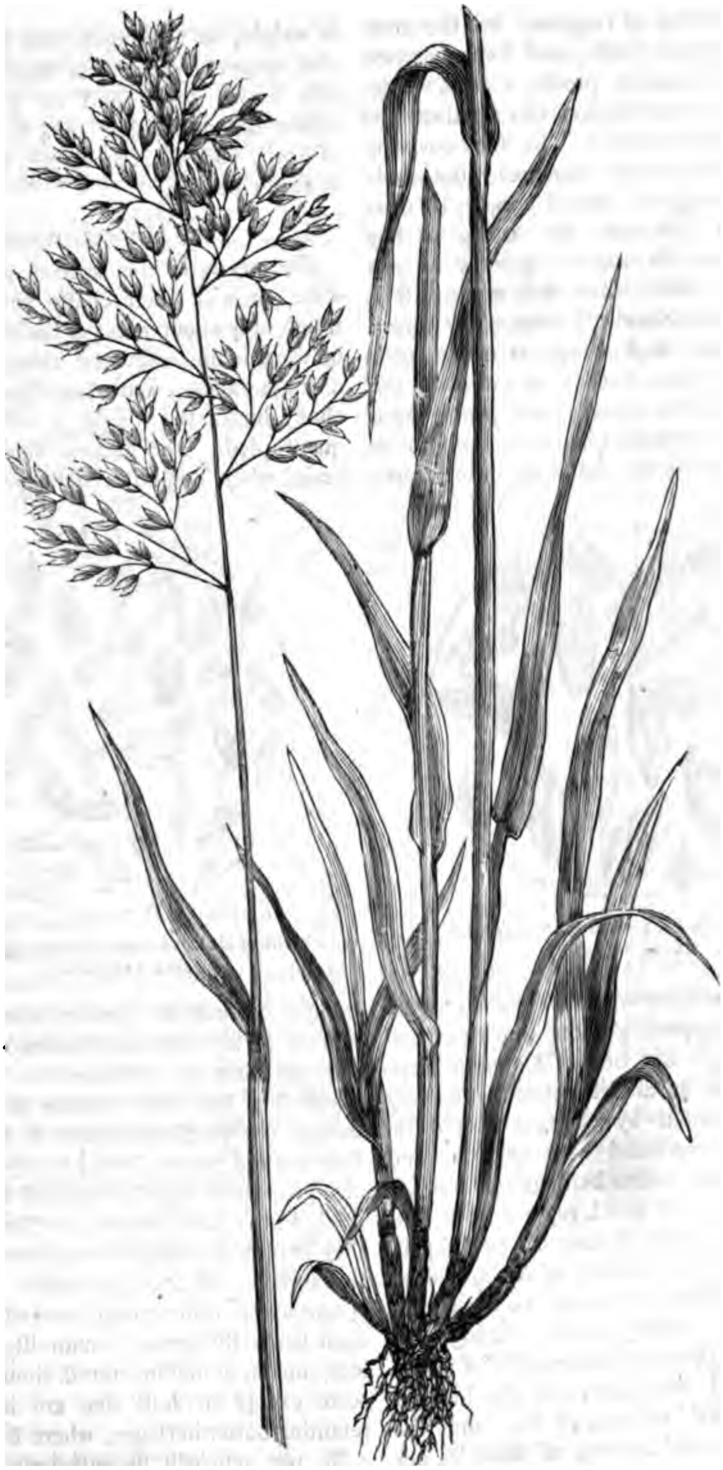
QUALITIES AND USES.

With the exception of the common rye-grass (Lolium perenne) this appears to have been the first of the natural grasses that wa cultivated in Britain, there being good reaso to believe that it was somewhat extensivel grown before the middle of the last century Hanbury recommended it in his "Complet Body of Husbandry," in 1770, as being earl giving a grateful odour to hay, and imparting a fine flavour to mutton which had be fed where it and the H. mollis abounde Marshall, in his "Rural Economy of Yo shire," 1788, seemed to have formed a mo correct estimate of its merits; for he stat that although "formerly in high estee being cultivated separately, and thrashed c like corn for its seeds, yet it was far fr being an eligible grass for cultivation, t growers of the seeds being the only perso that profit thereby, 80 bushels per a having been produced." Nasmith, in "Thoughts on various Objects of Indus pursued in Scotland," 1790, stated that it h "of late obtained a place in cultivati instead of rye-grass in some parts of Sc land, particularly in Ayrshire, where it called white grass." He added, howe that "the hay made from this grass is neit so eagerly eaten by cattle, nor so hig



Calyx--magnified.

Florets—magnifie



Holcus lanatus—natural size.

nourishing as that of ryegrass; but the crop is generally more bulky, and its hay, when made with judgment, proves a good wholesome fodder, upon which cattle may always be kept in tolerable plight." The thick covering of downy hairs which overspread the whole surface of this grass, retard greatly, by their retention of moisture, the drying of hay where it abounds, more especially in wet seasons, and even when well secured it is disliked by cattle, and still more so by horses. The abundance and cheapness of its seeds still induce some parties to cultivate this grass, but chiefly upon poor peaty lands where young ryegrass plants are likely to be thrown out by winter and early spring frosts, and on light silicious or other soils that are incapable of supporting more nutritious and valuable kinds. But being in general naturally too prevalent, and its seeds being easily disseminated about by wind, it should invariably be introduced with caution, and that only where better herbage cannot be reared. Grown on a clayey loam at Woburn, the produce of H. lanatus was 4764 lb. per acre about the middle of April, and at the period of flowering it was 19,057¼ lb., which lost in drying about 12,863 lb.; while at seed-ripening, the weight of green grass remained the same, but the loss in drying increased to 15,246 lb.; and the latter math was at the rate of 6806 lb. per acre—thus shewing a marked superiority in weight, at all stages, over Pacey's perennial ryegrass which was there grown on rich brown loam, and its yield in gree fodder was only about 4084 lb. on the 16t of April; 7827 lb. at flowering; and 14,974 l at seed-ripening.

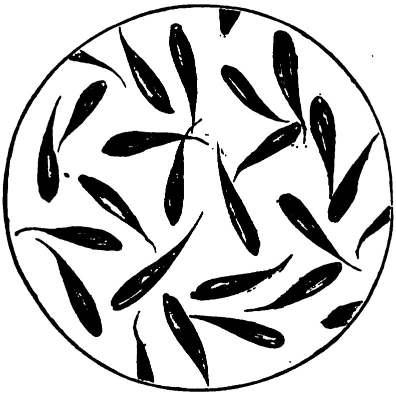
Seeds of Holcus lanatus in their natural state—magnified.

Seeds of Holcus lanatus in their "prepared" state—magnified.

SEED AND CULTIVATION.

The seeds of this species in their usua state, or with their chaffy husks attache weigh only about 7 lb. per bushel, and 95,00 of them is the estimated average number i a single ounce. But when deprived of thei chaffy husks, the weight is fully more tha quadrupled. The greatest number of thes braird when not covered deeper than ½ a inch, about half the quantity when the dep is from ¾ to 1 inch, and none come up wh the covering is increased to 2½ inch They thus not only vegetate from under deeper covering than those of many of t finer natural grasses, but, as the young plar also grow more rapidly, they are less liable injury in their early stages, and, consequentl they require no more careful preparation the surface soil than is usually allowed f ryegrass and other strong seeded kinds. most lands this grass is naturally too prev lent, and it, as before stated, should never l sown except in soils that are incapable retaining better herbage; where from 2 lb. 4 lb. per acre will be sufficient for mixi with other grasses and clover seeds.

The H. lanatus naturally abounds in some of he best ryegrass seed growing districts, and its seeds, when in their natural state, or enveloped n their chaffy husks, being easily blown out n cleaning the latter, they frequently accumulate in excess of the legitimate demand, so as to form "a waste substance," which, n popular language, is too often economized by "seed doctors," who, procuring t at merely nominal prices, separate the nner or naked seeds from their soft woody outer husks, and mix them in this less asily detected state among more valuable grass seeds, to the great deterioration of the sowers' crops. As these bear a considerable resemblance to the seeds of the crested dog's-tail grass, Cynosurus cristatus, hey are most frequently mixed with these, which being chiefly used for sowing down fine short grass lawns, those became entirely spoiled by the presence of this rough tufted and unsightly growing grameneous weed.



Seeds of Cynosurus cristatus—magnified.

CHEMICAL ANALYSIS.

Sir Humphry Davy stated that the result of his experiments shewed that the nutritive extract of H. lanatus consisted entirely of mucilage and sugar, and that, in taste, it resembled gum Arabic; whereas the nutritive matter of grasses most liked by cattle has either a sub-acid or saline taste; hence he suggested that it might be made more palatable to cattle by sprinkling the hay at stacking with salt; and the propriety of this has since been proved by pretty general experience. Professor Way's analysis of this grass, when in flower, shewed it to contain 69.70 of water; 3.49 of albuminous or flesh-forming principle; 1.02 of fatty matter; 11.92 of respiratory principles—starch, gum, and sugar; 11.94 of woody fibre; 1.93 of mineral matter, or ash. And in a dry state, 11.52 of albuminous or flesh-forming principle; 3.56 of fatty matter; 39.25 of respiratory principle—starch, gum, and sugar; 39.30 of woody fibre; and 6.37 of mineral matter, or ash. By the Woburn experiments, the nutritive extract at flowering was equal to 1191 lb. per acre, which had decreased to about 819 lb. at seed ripening, although the weight of green herbage was the same at both periods.

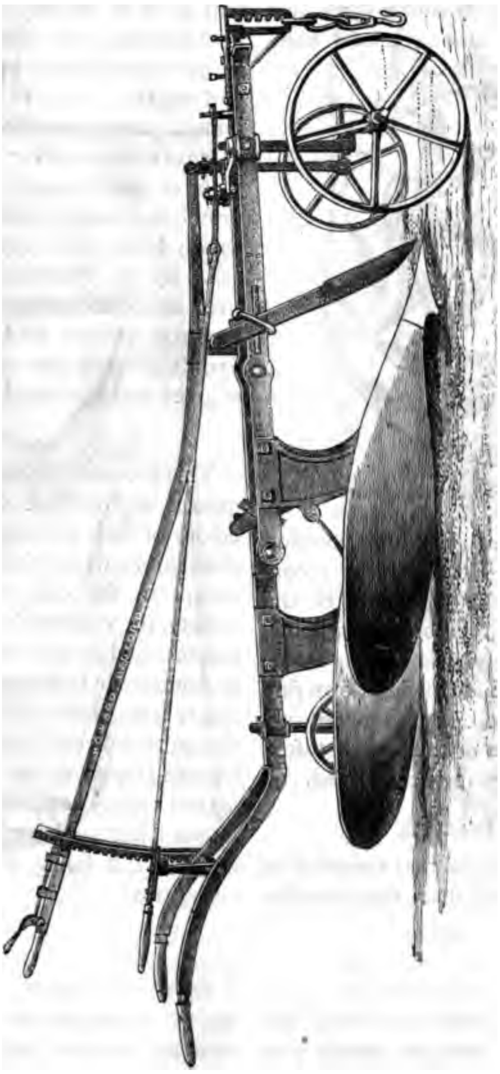
VARIETIES.

This is one of the most unvarying of British grasses, slight differences in the purplish green colour of their panicles being about the only distinctions which the different plants exhibit, except in the case of an albino or white variety, the cultivation of which has been recommended for the formation of dried grass, or immortelle bouquets; more especially such as are intended to be artificially coloured, for the more delicate tints of which the purplish headed stems are less suitable. A variegated leaved variety is named in some florists' catalogues; but we have invariably found this a misnomer, it being, in reality, the H. mollis variegatus.

Agricultural Engineering.

HOWARD'S DOUBLE-FURROW PLOUGH.

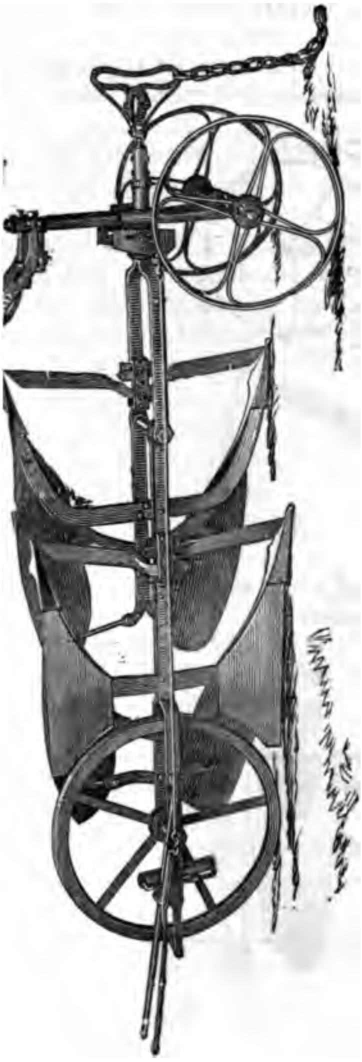
MESSRS J. & F. HOWARD, of Bedford, whose reputation for plough manufacture is world wide, have added another to their already numberless victories in the field, having succeeded in securing th position at the "All-England" trial Reepham, with their combined double-fu and subsoil plough. We give an engravi



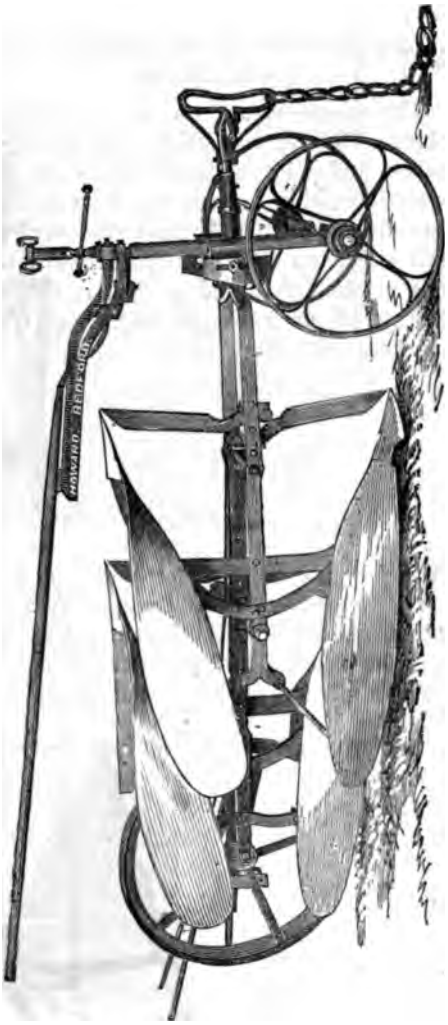
Howard's Double-Furrow Plough.

gh as a double-furrow, and regret that nable to give one of it as a sub-soiler, owever, we may do at some future eanwhile, stating that the change from furrow, to furrow and sub-soiler, is effected by removing the front plough ng in its place a sub-soiling tine. Our will be able to gather from the following cription the advantages attained in truction, which we may premise comghtness, simplicity, and strength.

ne simple lever, both the land and furrow wheels are steered. The plough therefore is more easily guided, especially on hill-sides, than when only one wheel is steered. This renders the holding of a double-furrow plough far easier work for the man, and it is also a considerable advantage at lands-end.



Howard's New Patent Double Turn-over Plough—Front View.



Howard's New Patent Double Turn-over Plough—Back View.

By a simple lever the depth of the ploughing is instantaneously regulated, and the same lever on arriving at the lands-end raises the points of the shares clear of their work. The bodies are fitted with Messrs Howard's well-known patent lever necks, so that the relative depths of the two ploughs can be readily adjusted.

The frame work is ridged, although easily adjusted to the required widths of ploughing, and the beams being firmly braced together, all springing or tremour—which causes loss of power—is obviated even in the very hardest work.

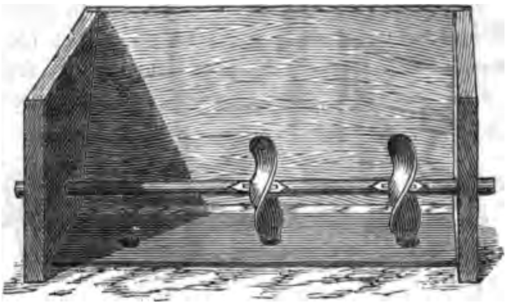
HOWARD'S NEW PATENT DOUBLE TURN-OVER PLOUGH.

The single-furrow turn-over plough of Messrs Howard has been long before the public, and is largely used where it has been found advisable to turn the furrows all in one direction. Not content, however, with this single turn-over, Messrs Howard have this season introduced a double turn-over plough, of which we give engravings, shewing front and back views.

This plough has two sets of distin
separate moving and cutting parts.
bodies and coulters are attached
common beam, made double, so
joints are avoided, and thorough rigi
tained. Instead of employing tw
frictional wheels in the rear of the
one frictional wheel of sufficient dia
used, so that it takes a bearing on
phery, whichever set of ploughs is
Handles are dispensed with, the
a hand-lever. The change of b
lands-end is effected by the plo
simply drawing back the lever catc
the draught of the horses instantl
one body out of work and the oth
into the return furrow. Indeed, th
sary change from the right to the l
furrow, is effected without any exe
the part of the ploughman.

REID'S DRILL FOR IRRIGATION.

We had occasion lately to refer to the seed drills manufactured by Messrs Ben. Reid & Co., of Aberdeen, and we have now the pleasure of giving illustrations of a novel drill for sowing on irrigated land, invented and manufactured by that well-known firm.



Reid's Patent Disc Seed-Dischargers.

We are indebted to our contemporary, the ***Engineer***, for the following accurate description of this new and valuable machine, and which will be easily understoo
readers :—

The machine which we illustrat
accompanying engraving has been in
to supply a well-known want among
turists, namely, a good drill for sow
on irrigated land.

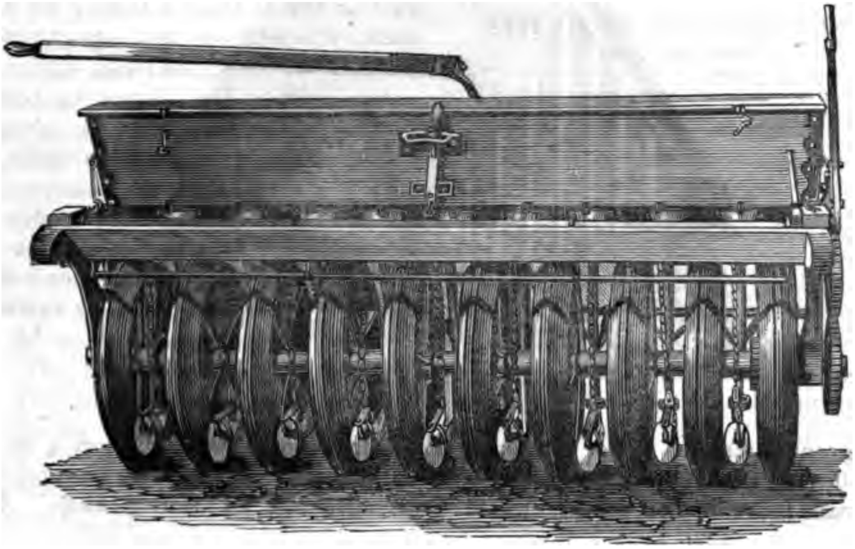
The principle of the drill consists
heavy press wheels to make furro
sow the seed in the ridges between

the water or liquid manure, in passing ı the furrows, will supply moisture to the of the plants, thus the press wheels : the furrows, and the seed is sown in the s. Each press wheel runs loose on the and the two outside ones and the centre ıave pawls attached to them, working on

ıd, and pressed down by a strong steel g.

ı the axle at the three points, for the s to catch, are keyed ratchet wheels, whether the centre press wheel only, or ·r of the outside ones only revolve, the is driven round and works the gearing at the end of the frame. The gearing drives the patent disc seed-dischargers in the corn-box, as shewn in the engraving, and they discharge the seed through the pipes into the ground.

The press wheels are placed 9 inches apart from centre to centre, and the coulters the same. The drill is as simple as it can be, and very strong. It is shewn with a single wheel steerage; and markers are attached (not shewn) to mark where the centre wheel is to go in the return bout. Scrapers also are attached to the drill, one to each press wheel, but those are not shewn.



Reid's Patent Drill for Irrigation.

SHARMAN'S POULTRY OR GAME REARING COUP.

R SHARMAN, of Melton-Mowbray, Leicester, has brought out what ıars to be a very excellent coop for ıtry and game rearing. It is described as "an improved registered folding rearing coop for pheasants, partridges, and general poultry." Its value will be understood from the figures and the letterpress we give. Fig.

1 represents the coop built up for use, and fig. 2 folded up for removal or storing. As may be noticed from fig. 1, it has a fall door for the chickens to run out and in, and at night this can be fastened up for protection from weather or vermin. A simple arrangement is made for ventilation, and handles are provided for the easy removal of the coop. One side has also extra hinges, allowing the breeders the means to examine the birds if required. The coop is built up with ease and despatch, the parts fitting so nicely together that it is complete for use in a very few minutes.

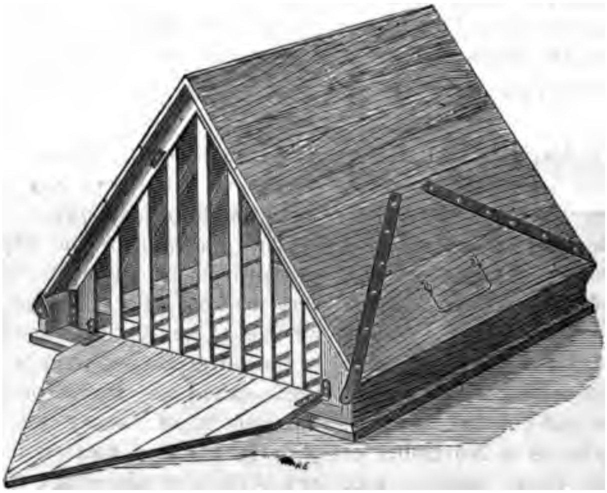


Fig. 1.

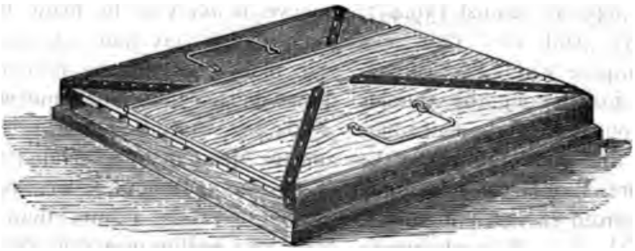


Fig. 2.

When the season is over, the coop can be folded into a space of about 4 inches deep, as shewn in fig. 2, which we consider a great advantage for storing away. Altogether, we think this well-shaped, handy, and convenient coop recommends itself to the consideration and trial of all breeders or fanciers of poultry, &c.

The Farm.

MPORT AND EXPORT OF AGRICULTURAL COMMODITIES.

HE Trade and Navigation Returns, which have been issued for the month, eleven months, ending November, w an increasing demand for animal food his country; or rather, it might be said, lack of home-fed cattle, and the expense rearing them. On the month, we note ecrease in the number of oxen and bulls the extent of about 2000 head; but nbining oxen, bulls, and cows, we have just ut the same number as in November of o. The price of these animals was, *oto*, very much the same, notwithstanding inferiority of the majority as compared h the quality received last year. Taking n, bulls, and cows together, in the eleven nths of this year which have passed, we eived in all 201,836, as against 159,457, l the amount we paid this year was ,227,297, to compare with £2,819,356. hould be stated that among the animals merated were about three-and-a-half times number of cows that were quoted in the turns of the like period of last year. Sheep l lambs were imported in vastly increased nbers, both in the month and eleven nths for which the Returns are made up— ., 89,928 in last month, to compare with 320; and 882,260, as against 634,083, up the end of November 1870. Still, with this excess of importation, we do not find it mutton gets cheaper. The dearness of s class of meat indicates one of two things either that the industrial population are tter off, or that the home stock is getting rcer in proportion to the increase of the ople than it was wont to be. For these eep, we disbursed, in the eleven months, 1,712,060. For calves, in the same period, : paid £137,400; and for swine, which were imported in slightly fewer numbers, £288,970. For live stock, therefore, we spent, in all, £5,635,727.

The increase in the imports, and consequently in the payments, of dead meat are very marked. For the one item of bacon, we paid £2,234,758, as against £1,450,843 in the corresponding term of last year. For beef, salted or fresh, or slightly salted, the amount of money we expended was £571,322. For meat not enumerated in any of the above headings, the sum for which we were debited was £85,458; and for preserved meat, not salted, £610,228, up to the end of the eleven months—an amount which shews that the Australian meat is rapidly growing in favour. An attempt, we believe, is likely to be made to introduce it more extensively than has yet been done; and many, besides the poorer classes, will desire its success. For hams we had to pay £164,080. Adding the price of the live and the dead meat expended up to the end of November, together, we find the amount reaches no less a sum than £8,031,573. Now, this really does seem too much for a country so well adapted as ours is for the breeding and rearing of stock of all descriptions, to hand over in eleven months to foreigners.

Nor have we yet done with the expense which we incur through the apathy, or want of means, which prevents us from making the best use of reclaimable lands for the rearing and feeding of fat stock, dairy animals, and poultry. Foreign butter, many will be surprised to hear, cost us, up to the end of the eleven months, £6,419,642; cheese, £3,141,402; and eggs, £1,171,340. Neither is "the harvest of the sea" so well garnered by us as it might be—seeing that our coasts abound with the finny tribe—as we find that for fish we had to part with £462,466. These figures bring up the amount we have expended in the eleven months on animal food, dairy produce, eggs, fish, &c., to the enormous total of £19,226,421.

Coming now to bread stuffs, we have again to note a large augmentation in the imports of wheat alike in the month and eleven months. In the course of last month we imported 4,104,197 cwt., as against 2,511,726 cwt. in November of 1870; and in the eleven months the quantity rose from 28,481,436 to 36,469,535 cwt. The amount disbursed for wheat alone in 1871, so far as it has officially gone, is £21,580,316, as against £14,879,335—about £6,750,000 of difference. Barley and oats were in greater demand; but the value of oats was not so much as in the previous year. Peas were in smaller supply; beans more in request; and wheat meal and flour, although we received about 750,000 cwt. less, made more in value, than it did in the same period of last year, by very nearly £70,000.

The following table shews the precise quantities received, and the places whence they were derived, with their values during the eleven months of 1870, and those of the present year:—

QUANTITIES.

Wheat.	Eleven Months ended Nov. 30, 1870. Cwt.	Eleven Months ended Nov. 30, 1871. Cwt.
Russia	9,446,686	14,859,232
Denmark	326,537	123,558
Germany	3,299,914	2,852,289
France	212,603	134,841
Austrian Territories	46,272	239,147
Turkey, Wallachia, and Moldavia	434,871	1,411,746
Egypt	104,950	711,179
United States	11,407,695	12,202,108
Chili	580,967	503,529
British North America	2,396,644	2,818,195
Other Countries	224,297	613,711
Total	28,481,436	36,469,535

VALUE.

Russia	£4,653,301	£8,499,492
Denmark	164,495	73,838
Germany	1,918,849	1,884,109
France	116,007	72,345
Austrian Territories	21,261	158,475
Turkey, Wallachia, and Moldavia	194,662	733,843
Egypt	45,239	394,274
United States	6,005,272	7,353,605
Chili	348,977	332,627
British North America	1,287,549	1,698,624
Other Countries	123,723	379,084
Total	£14,879,335	£21,580,316

QUANTITIES.

	Eleven Months ended Nov. 30, 1870. Cwt.	Eleven Months ended Nov. 30, 1871. Cwt.
Barley	6,603,268	7,818,847
Oats	9,818,225	10,238,770
Peas	1,699,496	876,230
Beans	1,371,028	2,734,892
Indian corn	15,823,919	15,527,235

VALUE.

Barley	£2,575,743	£3,092,577
Oats	3,953,027	3,723,455
Peas	707,567	389,896
Beans	587,737	1,172,798
Indian corn	5,448,232	5,968,150

QUANTITIES.

Wheat Meal and Flour.	Eleven Months ended Nov. 30, 1870. Cwt.	Eleven Months ended Nov. 30, 1871. Cwt.
Germany	799,092	881,290
France	642,330	29,097
United States	1,996,073	1,674,306
British North America	369,471	348,285
Other Countries	574,227	712,106
Total	4,381,193	3,645,084

VALUE.

Germany	£561,750	£828,794
France	464,594	25,615
United States	1,337,296	1,294,409
British North America	264,761	269,126
Other Countries	425,761	705,152
Total	£3,054,162	£3,123,096

Coming now to the substances which supply that fertility to the soil which the scourging of corn crops and the robbing by cattle-feeding take out of the land, we find that bones have decreased very considerably during the month, in fact they have fallen off in

e of this November, as compared
corresponding month of last year,
ne-half—the quantity received in
r being only 5500 tons, as against
ns. In the longer period, however,
s an increase, just compensating for
on the month. The price of this
fertilizer remains at about much the
ure as it did last year. The total
we paid in the eleven months was
6—last year, roundly speaking, we
5,000 less.

"a falling off is there"—in the
of guano, alike in the month and
onths—from 26,791 tons to 10,115
he shorter period, and from 239,046
174,118, in the longer. We paid
o this year £1,960,885; last year
992. It is to be hoped that the
e in the sums does not represent
m the soil, but rather advantage to
nufacturers who have been ingenious
o find other ingredients as valuable
ncentrated commodity which comes
Chincha Islands.

e of soda would appear to be rising in
s the supply of guano diminishes, or
succumb in esteem. The quantity,
ve heretofore had occasion to note,
gradually increasing month by
In the past month we took about
cwt. more than in November of
d in the eleven months, well on to
illion cwt. in excess of the imports
year. The cost amounted to
510, to compare with £741,445.

e above three principal articles of a
character imported, we disbursed
r £3,510,711.

rence to feeding stuffs, we remark
eed cakes were imported in smaller
s during last November, than in the
nding month of the previous year,
e longer period, we had a larger
about 10,000 tons more—the precise
ing 137,647 tons in 1870, and in
7,316 tons. Cotton-seed is being
more extensively than last year,
being for the eleven months,
10, as against £968,545. Flax-seed
and linseed, and rape, were also both in greater request. For the former two commodities conjoined, we paid in the aggregate £3,460,027, and for the latter £1,800,737. Potatoes, probably on account of the disease which has attacked our home crop, have reached us in much larger quantities during the month than they did in the same period of last year—viz., 171,512 cwt., as against 6243 cwt. The amount we paid in November was only £1041, in the same month of last year it was £39,687. In the longer period, however, for which the Returns are made up, we have had a shorter supply.

We have received a shorter supply of wool in the month, chiefly on account of smaller shipments from South Africa; but the aggregate for the eleven months is greater than last, as will be seen from the following tables:—

QUANTITIES.

Wool, Sheep, and Lambs.	Eleven Months ended Nov. 30, 1870. lb.	Eleven Months ended Nov. 30, 1871. lb.
From Countries in Europe	19,798,387	50,393,275
,, British Possessions in South Africa ...	29,948,550	31,110,508
,, British India	10,625,092	18,882,877
,, Australia	171,153,377	182,280,720
,, Other Countries......	14,425,341	29,773,855
Total	245,950,747	312,441,235

VALUE.

From Countries in Europe	£1,071,771	£2,781,649
,, British Possessions in South Africa ...	1,908,330	1,659,055
,, British India	328,628	674,389
,, Australia	10,868,572	10,812,190
,, Other Countries......	447,212	1,125,574
Total	£14,619,513	£17,052,857

As a set-off against the large account for the eleven months in which we are indebted to strangers, we have only against them, of purely agricultural produce, as in these accounts recorded, £88,475 for cheese; £301,777 for butter; for horses, £269,846; and for wool, £740,291. The following table shews the value and quantities of the exported wool, and the countries receiving it:—

VALUE.

To Germany	£83,110	£145,029
,, Belgium	67,232	158,847
,, France	208,431	195,914
,, United States	93,911	125,101
,, Other Countries ...	73,015	115,400
Total	£525,699	£740,291

QUANTITIES.

Wool, Sheep, and Lambs.	Eleven Months ended Nov. 30, 1870. lb.	Eleven Mo ended No 30, 1871. lb.
To Germany	1,168,656	2,083,94
,, Belgium	995,632	2,445,
,, France	3,075,645	2,531,8
,, United States	1,942,804	2,247,3
,, Other Countries ...	1,046,864	1,486,15
Total	8,229,601	10,794,4

PRUSSIAN AGRICULTURAL STATISTICS OF 1871.

ALTHOUGH the Official Returns of the Prussian Board of Trade have not yet been published, the following may be taken as a near approximation of the harvest returns:—

Wheat	86	per cent.	of an	average crop.
Rye	81	,,	,,	,,
Barley	98	,,	,,	,,
Oats	101	,,	,,	,,
Potatoes	59	,,	,,	,,

The produce may therefore be reckoned at—

		Cwt.			Cwt.
Wheat,	about	43,000,000	against	aver. of	50,000,000
Rye	,,	81,000,000	,,	,,	100,000,000
Barley	,,	59,000,000	,,	,,	60,000,000
Oats	,,	66,000,000	,,	,,	65,000,000
Potatoes	,,	280,000,000	,,	,,	475,000,000

the cwt. being reckoned as 52 kilogrammes. From the above, we learn that the only cereal crop which shews an excess of yield beyond the average is oats, and it will be noticed that such excess is to no very considerable extent. There is a marked deficiency in the potato crop, amounting to 41 per cent., or about 195,000,000 cwt.; and the present will therefore be classed among the bad years, such as 1846, when the crop only yielded 53 per cent. of an average; in 1851, when the yield only amounted to 47 per cent. of an average; in 1853, when the return was 57 per cent. of the average; in 1854, when the return was 56 per cent. of an average yield; and in 1860, when the result was 58 per cent. of an ave
crop.

As a result of the vast decrease of
potato crop, a considerable influence
sooner or later be produced on the valu
that important article of food, as well as
rye, which is known to be the chief subst
for it in Germany, and as there is a defici
in that crop also to the extent of 19 per c
it may not be found to be readily avail
for that purpose. As yet, the price of
is such that many farmers will continu
make use of it for feeding their cattle,
thus reduce the quantity available for hu
food, of which the eventual result will al
to diminish the quantity of wheat that
otherwise have been applied to the pur
of exportation from Germany—all of w
indeed, that can be spared for shipme
Great Britain, France, and Belgium, will
be so great as to have much influenc
those western markets, as is already evi
from the high prices now ruling in Gern
which do not admit of shipments being
from thence with any prospect of profit
is impossible not to see that present
ments, either from the northern por
Europe or from the United States, must
leave more or less loss, and it may ther
be imagined that many of them are
signments made in the hope of an adv
in the price during winter, when su
must fall off.

CULTIVATION IN SHROPSHIRE AND STAFFORDSHIRE.

THE following is the general description of farm cultivation in Shropshire and affordshire, given by Mr John Wheatley, r W. Sandy, and Mr Jackson, in their report these counties in the *Journal* of the Royal gricultural Society of England :—" We were uch pleased with the general cultivation of e districts in the two counties through hich we travelled. The fences were the ost apparent drawback, but we acknowdge the difficulty of making either good or tractive the present old crooked fences on banks, which are so very general. Our st visit of inspection was at the time fallows ere being prepared for turnips, and nothing uld exceed the excellence of the system dopted. Autumn cultivation is almost inariably practised, and frequently by steamower. So thoroughly do they cultivate and ulverize the soil, that success is next to a ertainty; and with the autumnal application f fold-yard manure, and the heavy dressings f artificial in the spring, many farms, beides those specially brought under our otice, were in a high state of fertility, bearng out this principle—that the successful ultivation of green crops is the foundation f all good and profitable farming. No loubt, as a rule, the arable land is well nanaged; but we could not approve of he system of sowing such large quantities f ryegrass amongst the clovers; for it must ave (and this the growing wheat-crop proved) deleterious influence upon the success of hat crop. Some system should be adopted, s in other counties where clover sickness prevails, to alter the rotation so as to replace he clovers by a green crop, either peas, eans, or vetches; which ever of these crops be introduced must be governed by its adaptation to the soil. The sowing of such a large quantity of ryegrass was the only feature of which we did not approve, and seeing, as we did, the universal thin plant of wheat soon after ley, we became even more convinced that this was the cause. The grass land, as a rule, is well managed, but where bones and artificial manures had been applied, there was a marked improvement in the quality of the herbage. Irrigation appears on the increase, and wherever it was considered practicable to obtain water for this purpose, it was made available, and we heard of many instances of tenants having borne the whole expense of securing it. As a rule, the buildings were inadequate to the requirements of many farms; and, as we travelled, our attention was frequently drawn to this particular, as well as to many steadings in a dilapidated condition. This, we trust, may not continue long in the present age of improvements, and especially where tenant-farmers are so liberal in their outlay for manures. Good tenants, assuredly, must be deserving of sufficient and commodious buildings, without which they cannot fully carry on the proper cultivation of the land. We were glad to find cottage accomodation upon farms for the labourers, and in all instances they were highly appreciated by the tenants. Only one farm in our inspection, namely, Mr Mays of Elford Park, whose farm we highly commended, was without this convenience. His labourers had to walk 2 miles night and morning, and the difficulty of securing good workmen, with this drawback, is, Mr May informed us, becoming constantly greater."

FARMING IN EAST LOTHIAN.

INTRODUCTION.

We propose to give a series of articles on the system of agriculture practised in East Lothian during the last thirty years—with reference to the changes which have taken place since guano was introduced, since railways opened an easy and cheap communication with the southern markets, and since Free Trade became a *fait accompli*. For the information of those who may wish to know, we give the natural aspect and general condition of a county which has so long held a leading position in regard to the development of the agricultural resources in the United Kingdom.

East Lothian, or Haddingtonshire, is a small county. It extends 26 miles from east to west, and 17 miles from north to south, its area being 291 square miles, or 179,142 acres, of which 173,297 are land, 189 water, 149 links, or places set apart for public recreation, and 5505 acres of pasture. It has neither high mountains nor great rivers, but its scenery is fine, and the best view is from Lammer Law, the highest peak of the Lammermuir hills, which separates the county from Berwickshire. Looking away to the seaboard, which extends the whole length of the county, the view of the Firth of Forth is very beautiful. Inland, the character of the county may be best described as having the appearance of two great waves extending from east to west. The Garleton Hills—rendered more prominent from the column erected by the tenantry to Lord Hopetoun—North Berwick Law, and Traprain Law, being the only hills of any note. The county is dotted over with many an antient stronghold, the finest, and with greatest historical interest, being the castles of Dunbar, Tantallon, and Dirleton. We may here remark, that these antient builders of castles must have been no mean judges of land, as good soil is invariably found in close proximity to an old tower. The Tyne is the only river of any importance. It flows almost through the centre of the county, and along with various smaller streams, by which the whole county is intersected, have been well adapted for these purposes of drainage by which the fertility of the soil has been so effectually promoted. Like the rest of Scotland, East Lothian has derived immense advantages from the Union with England, of which no other evidence need be given than a comparative statement of the valued rent of the county, which, in 1674 was £14,072; whereas in 1870-71, it is £283,820, as shewn in the following table of returns from every parish, viz.:—

Parish.	1870-71.		
Aberlady	£10,902	15	0
Athelstaneford	10,750	12	0
Bolton	4,029	10	0
Dirleton	15,903	13	0
Dunbar	22,050	2	0
Fala and Soutra	2,590	10	0
Garvald	13,180	17	0
Gifford	9,384	19	0
Gladsmuir	16,258	14	0
Haddington	26,720	18	0
Humbie	11,291	0	0
Innerwick	11,601	16	0
Morham	3,924	14	0
North Berwick	14,496	0	0
Oldhamstocks	5,409	10	0
Ormiston	6,866	13	0
Pencaitland	10,076	13	0
Prestonkirk	17,398	10	0
Prestonpans	9,239	13	0
Salton	5,693	16	0
Spott	7,380	2	0
Stenton	7,316	17	0
Tranent	22,826	12	0
Whittinghame	8,942	7	0
Whitekirk	12,580	8	0
	£283,820	1	0

This, it must be observed, is exclusive of railways, which alone are now estimated at £12,810, not very far short of the valuation of the whole county at the earlier period.

Its vicinity to the capital has always been a benefit to East Lothian, as a tolerably good market was open for its produce, while its proximity has possibly tended to make its proprietary the most aristrocratic in the kingdom. It numbers 1 Duke, 1 Marquis, 5 Earls, 5 Barons, 3 titled ladies of nobility, and 10 Baronets; and there are also several commoners of great wealth, and not a few owners of smaller properties, who mostly farm their own lands. We cannot speak positively with what success, but we remember, some years ago, of one having refused to pay his Income-tax, under the head of tenants' profit. Times have altered since, and many of these properties shew excellent management. East Lothian, in former days, was distinguished for the skill, energy, and enterprise of many of its farmers; were the names of those to be given, it would shew how few remain, but we maintain that there are farmers in East Lothian at the present day second to none of those who have gone before, and second to none in the United Kingdom.

In regard to the changes which have taken place in the agriculture of East Lothian, we shall first refer to the effects of Free Trade. We well remember the gloom it cast on many of us when wheat fell to 39s. per qr., barley to 24s., and oats about 16s. It took some years before we could see it was wise legislation which was lessening the burdens pressing on the people, and at the same time removing obstacles which suppressed and hindered the struggling growth of wealth and independence. We believe now it has reached in its good effects the very trade we all thought it would ruin, but at the same time it must be remembered that these great changes had many accompanying difficulties, for it was impossible to tread the steps which have not been shrunk from in the onward march, without passing through a period of transition. It was the serious apprehension of the difficulties arising during this period of transition, that promoted the cautions and prudent opposition of those politicians who, having now overcome the initial disadvantages, willingly recognize the beneficial character of those legislative measures. The proof which is most convincing of the way in which agriculture is being forced into the same line of improvement as other trades, is the increasing introduction and use of machinery in the different operations where it can be substituted for manual labour, or applied to increase the labour of man.

This is especially remarkable in East Lothian, where the sight of a tall chimney in every farm-steading tells of the help given by the use of machinery, of the appreciation of the increased power of production, by the application of the discoveries of science and art. Agriculture is a science of which the object is to raise the produce of the earth to the highest point which it is possible to reach, to combine the assistance of invention with spontaneous efforts of nature, and to adapt the increased knowledge, and the universal progress, which is making itself conspicuous on every side, by the economical and most profitable cultivation of the soil.

II.—CROPPING—LORD TWEEDDALE'S YESTER FARM.

We have already alluded to the strong Protectionist feelings which animated a very large number of the East Lothian tenantry, but they have been wise enough to see that the only antidote to Free Trade lay in improved husbandry, and this is one of the great causes of the progress made during the last quarter of a century. In its own art, agriculture is growing more scientific every year, and while improved implements are to the farmer very much what the power loom was to the manufacturer, and chemistry so much assistance to its operations and the science of producing the utmost quantity of corn and meat in the shortest time and in the most economical manner, has been so studied and adopted, that real good cultivation is no longer confined to the best districts, but is more or less recognized in every corner of the land. So great, indeed, has been the change wrought by subsoil drainage, improved implements, and extended knowledge of feeding and breeding, and, above all, by the introduction of railroads, which have imparted a spirit of commercial enterprise to farmers, that the whole face of the country has been transformed. East Lothian is no longer the oasis of the desert she once was—she has now many compeers.

But to come more particularly to the subject in hand. In East Lothian, as may be supposed, there are varieties of soil; and for the convenience of illustration, we shall divide the county into three districts—the southern, the midland, and the northern—each of which, in succession, we shall attempt to give some account.

Of the southern, no better example can be adduced of the mode of agriculture pursued than that which is afforded by the home farms of the Marquis of Tweeddale, to whom, from the high position of his Lordship as an agriculturist, such precedence is due. The home farms of the Yester estate are a model to the whole of the United Kingdom: Situated near the base of the Lammermoor Hills, about 425 feet above sea level, and therefore in a colder climate than either of the other districts, the grain grown on them can compete successfully with the produce of the others; it having been admitted by the best practical judges that the oats and grass during these last dry seasons, on what might be almost called uncultivated land, until recently subsoil ploughed, were among the best in the country. This proves the immense advantage of deep cultivation, and the peculiarity of Lord Tweeddale's deep cultivating ploughs lies in this: their frame-works are of wood and moulds of a particular shape, which, while cutting the furrow deep and square, do not admit of the poor subsoil being thrown on the top, as deep work can be speedily executed by the steam plough cultivator, but unless the soil is loamy and very deep, a rotation of five crops may be run before land with a poor subsoil may recover its character. The extent of these home farms is rather more than 1600 acres, and seventeen pairs of horses are found sufficient to do all the cultivation, besides some extra work in carriages of different kinds, in connexion with all the requirements, on the estate.

CROPPING.

The farms in Lord Tweeddale's occupation, as well as those let on the estate, are under a five-course shift, viz., two years grass, oats, turnips, barley, and then grass again—little or no wheat being grown on any part of the estate. This rotation is made a condition in all the leases; but if any exceptional case should arise, it may be varied, if the reasons assigned should meet with his Lordship's approval.

FEEDING STOCK.

It has been found, from the experience of an average number of seasons, that one bullock, or seven sheep, is sufficient for 1 acre of turnips; this, of course, applies only to lean animals bought in autumn and sold off fat in spring. We do not intend in this report to enter into the variations of stock management, which are as numerous as the changes of soil and climate. We merely state what has been found to be a safe and profitable calculation for a full winter keep. In the management, or, we might say, farming of his sheep stock, Lord Tweeddale has found it advantageous to purchase well-bred lambs at the large south country (Scotch) fairs, and to feed them off the following year, invariably taking the fleece off before selling them. Exception may be taken by some, especially *now*, when the price of wheat is so much higher than the price of barley, that its cultivation should be discouraged on the Yester estate; but for the last ten years, barley has very nearly realized the same price per qr. as wheat, and being especially, in the later districts of the county, a crop that can be reckoned upon as more certain. The whole routine followed at Yester has been well described by the author of the "Book of the Farm," and any one anxious to learn more fully all matters of detail has only to refer to its pages; but all that has been previously so well told on the subject has been of late confirmed by practical farmers who enjoyed the advantage and privilege of thorough personal inspection.

AGE OF HAVING A PRACTICAL FARMER FOR A LANDLORD.

ı great boon to farmers when their l is a practical agriculturist, who is satisfy himself that justice is not only the land, but that nothing more than due is required from the tenants. lvantage the tenantry on the Yester fully enjoy, their farms being held on ıitable principle of "Live and let ›y which all their leases have been :d. Lord Tweeddale may therefore be have the power of selection of his , who are consequently men of capital terprise. We will now give illustra- some of the farms let *on lease.*

—NORTH AND MIDLAND DISTRICTS.

ıs often been remarked, the success attends Scotchmen when they go land or the Sister Isle, to occupy ;ition of land-stewards or gardeners— ·k which the writer has heard in both ıs of our realm. And the observation ninent English farmer with whom the :njoyed the privilege of a tour through , confirmed this, by saying, "How is ıt every well-managed farm we see a ;g Scotch steward?" We told him hnston's definition of oatmeal, and ;wer, viz., oatmeal from oats, the r men in Scotland and horses in d! But where will you find such nd such horses? However much .y esteem ourselves, we are not o the merits of others, and we feel nearly ever farmer in Great Britain ɛnowledge a debt of gratitude to Mr who never made a truer remark than e alluded to the very large increase could be made in the agricultural re- of our kingdom, by reclaiming the ınds.

:ustration we give what has been done :he last few years in this highly cultiva- ıntry. We take as an example, the Long Yester on Lord Tweeddale's which has 800 acres arable, and 900 On this farm much of the moor land is being reclaimed, 300 acres having within the last twenty-five years been converted into arable, by which its value is greatly increased; a great deal of moor land has also lately been reclaimed on the farm of Kidlaw. Another of his lordship's hill farms, Snawdon, in the occupancy of Mr Harper, a well-known and much respected agriculturist, where you can hear the moor cock as he flies off a corn stook, is a fine illustration of these partly arable and partly moorland farms. Newlands is another of these, famed for a true breed of blackfaced sheep, which Mr Clapperton's skill has brought to great perfection. Of the purely arable farms we take as illustrations, those of Castlemains (Mr Smith), and Marvingstone (Mr Lees), both in excellent cultivation. The Leicester sheep on both of these farms have few compeers, and have gained the very highest premiums of the East Lothain Agricultural Society, as well as of several shows in the sister kingdom, which sufficiently established their fame. As we intend in a future article to give the rent of the land over the whole county, we need not mention it here.

We take now a cursory glance at the midland district and estates, which are so numerous; it is not easy to make a selection to describe, but we may direct attention to the fine property of Lord Hopetoun, on which many of the tenants may be said to enjoy hereditary privileges, their farms having been held by succeeding generations during many leases. We may also add, that all have had permission to shoot for at least thirty years, permission being granted yearly on application. The estate of the Earl of Wemyss is very extensive and valuable, running as it does almost continuously from north to south, right through the heart of the county. We give the farm of Tanderlane as a fine example of true soil, both for its yield per acre of grain and the fattening powers of its green crops. Southfield, lying almost in the northern district, is another fine illustration of the generosity of the soil, in returning the liberality with which it has been treated for many years. Whittinghame estate, the property of Mr Balfour, contains many first-class farms. Sir

Thomas Hepburn, of Smeaton, owns some very valuable land; also Sir David Kinloch, of Gilmerton. In the days of extensive bean husbandry—when the proportion of land under beans was equal to the acreage under potatoes now-a-days, the farms of Markle and Markle Mains, on the estate of Gilmerton, were admitted to grow the best, and to them this is no mean test of the quality of the soil. The writer can recall experiments made by his father of growing wheat and beans alternately on the same portion of a field, till at last the beans positively refused to grow, while the wheat continued to give an average yield. We repeat here, that land never forgets having been well farmed. An ancestor of Sir David Kinloch devoted much attention to agriculture, and one of the Markles was farmed by one who was not only a skilful farmer, but a well-known able writer on agricultural affairs.

Sheep.—Having mentioned the Leicester and blackfaced sheep of the southern district, we have now to add that the midland is equally to be commended for its Southdowns, as those of the late Mr Aitchison, of Alderstone, and especially those of Mr Skirving, Camptown, have gained many premiums.

Cattle.—East Lothian was never celebrated as a breeding county for cattle until Mr Douglas, of Athelstaneford, entered the field. Many others had tried, and to some extent were tolerably successful; but her celebrity rests on the almost unparalleled fame of the Athelstaneford her We remember a time when at every impo ant shorthorn exhibition in the United Kin dom one of Mr Douglas' famous Rose fami was sure to win a prize—within a very sho time Mr Douglas had won upwards of 2 money prizes and 25 gold medals; while thr two-year-old heifers, bred at Athelstanefor won the three national first prizes, viz., Ro of Summer, in 1854; her daughter, Rose Athelstane, in 1857; and Second Que of Trumps, in 1858.. Among so ma beauties it is difficult to select the be but we must say that for symmetry never saw a more perfect animal th the Rose of Summer. Unfortunate the journey home from the Paris sho in 1856, proved fatal to her, leaving blank in Mr Douglas's herd which he could never be supplied. The splend character of her progeny had, however, be established in the beautiful Rose of Ath stane, and the fine Sir James the Rose. can only compare the loss on that occas by Mr Douglas, to that which was sustai by Mr I'Anson when he lost the seco Eleanor of the turf, in his famous m Blink-Bonny. There are some fine sh horns still bred in the county by Mr four, of Whittinghame; Sir Thomas H burn; Mr Tweedie, Deuchrie; Mr Bin Seton Mains, &c. Mr Balfour took first p with Great Seal at Perth, and was also th at the International at Battersea.

ECOMONICAL STORING AND FEEDING OF TURNIPS.

IN an article on the above subject, written for the object of shewing that turnips are best for, and most palatable to, cattle when placed before them newly pulled, "provided always the bulbs have never been frosted, free from frost at the time of pulling, and dry," the *Aberdeen Free Press* says:—"In autumn, when cattle are put upon turnips, the fields or portions of the fields liable to be flooded, or which are particularly owing to surface water, ought to be cleared of crop, for two reasons:—1. crop is consumed before rot, very preval on fields so conditioned, gets time to do destructive work; 2. By early consuming, crop stands a good chance of being ca to the byres before the soil becomes thoroughly saturated by autumn rains as the horses' feet to make deep pits, and art-wheels to make deep ruts, thereby :nting the soil from getting into a rmed" state, and very detrimental to the ;eding crop, as is the case when surface · finds pits and ruts to stand in. Such fields, ırtions of fields are, by all thoughtful far- , sown with early varieties. Generally cing, during the earlier part of the season, nly agent having a tendency to impair the ng powers of turnips is rain. Now, very r rain is a friend causing the crop to m in a way really delightful to the ılturist. When the husbandman pre- the friend in field from becoming a foe : byre, he has gained his point. When ps are carted to the byres wet, a quantity il always adheres, which has the effect ıusing cattle to "scour." The conse- ce is that the crop is being consumed ıut a corresponding amount of condition ; put upon "feeders," or healthy growth ıg store cattle. For reasons too obvious quire mentioning, it is not at all desirable ıave anything like a store of turnips le the byres during the earlier part of the ın, but were it made a point to take : at least a few days' supply whenever ky or the glass, or both, gave indications oming rain, much good would result from, since it is in every way desirable ıve the turnips in the drills as long as be during the earlier part of the season. doubtless very tantalising to procure orary stores, but were an intimate ac- ıtance with meteorology cultivated, it d be both surprising and gratifying how the temporary stores and the ever ging weather would tally, the one with ther.

e now come to treat the subject in an st entirely different aspect. For con- ınce, say Martinmas is close at hand; › speak more pointedly, making allow- ; for earlier and later localities, turnips arrived at maturity. Perhaps the term rity requires a word or two by way of fication. Properly speaking, under :rable circumstances, turnips are not ıturity until they begin running to seed earlier or later in spring, according to temperature. The term maturity, as here used, is meant to indicate the time when turnips will keep in stores ready to furnish food, grateful to cattle and profitable to owners, during continued frosts or rains. Stores of turnips, topped and tailed, placed in sheds, or otherwise protected from frost and rain, beside the byres, are the nearest approximation to bulbs in prime condition, when such cannot be procured. In storing, tailing is not absolutely necessary. Canadian farmers, who store all their turnips, tail none, but it is more convenient to tail, always bearing in mind not to separate the root too near the bulb. The quantity stored ought to last through frosty and rainy weather; through the latter, in order to prevent scouring and its consequences, already mentioned; through the former, because frozen turnips are very bad for cattle. In fact, a conviction is gaining ground that many animals die directly from being kept for lengthened periods on frosted turnips, and that many more die indirectly from the same cause. Were plenty of turnips stored, how different a tale would be told! Select for storing turnips growing on a pretty elevated portion of the farm (should such be on the farm); should the soil incline to a gravelly nature, so much the better, as under such conditions, turnips are the least liable to be affected by rot; should the above favourable conditions be unattainable, of course, just select those fields, or portions of fields, having the least tendency to produce rottenness in the bulbs. Having done so, send off the workers, under the charge of a suitable leader, with strict injunctions to throw aside bulbs affected with rot. Owners, or their overseers, ought to make it a point to throw up the stores into shape with their own hands, or at least assist to do so, thus detecting some, at least, of diseased bulbs which will find their way to the store, despite the best care in the field. But owners or overseers throwing up the store, are the best check that can be got upon the indifference of the field-workers in the matter of diseased bulbs. As diseased bulbs contaminate sound ones to a very great extent, it is worth great pains in rejecting those which are unsound. Having provided a store, take daily rations out of it whenever frost sets in, and when wet weather would cause turnips to come to the byres with soil adhering, or the cartage prove detrimental to the succeeding crop; augmenting the store, when considered requisite, every fresh and dry day.

We would here make a distinction between *storing* turnips and *laying* them. By storing is meant exclusively the quantities placed beside byres for use as described above. By laying, is meant covering the bulbs with soil in rows in the fields, the object or aim of which is to obtain bulbs, as nearly as may be, in prime condition during the fresh and dry weather, which is to be expected at intervals all through the winter, and protection from spring winds and growth, always bearing in mind that laying is not to be considered of use during frosty and wet weather. Laying, when rightly done, has this important advantage over pitting—the bulbs are not cased close together, thus avoiding the great danger of diseased bulbs contaminating sound ones.

To arrive at the full value of laying, it has to be borne in mind that turnips undergo little, if any, deterioration from being frozen to the core the one week and thawed the next for weeks in succession, provided there be a covering of mould to the thickness of only 1 inch or even less. Be it borne in mind that the covering of turnips laid one drill in a row, requires no more horse work than "furring up" without laying, a work few, if any, now grudge, only the price of hand labour additional; "furring up" without laying is next to useless, or, at the most, the object aimed at scarcely half accomplished, since alternate frosts and thaws make the mould shortly crumble down, leaving the bulbs nearly as much exposed as ever. But should the mould keep up, as it may do, in certain natures of soil, matters are little mended. When frost sets in, wild animals can only get at the base of the tops, thus cavities are formed which fill of water, causing the bulbs to rot at double quick time. Were the object to make manure of the turnips for the next crop, we know of no more effectual method of compassing it.

The only objection we ever heard against single furrow-laying was, that splitting up every drill so early in the season had a great tendency to cast to the surface the farm manure that might be still imperfectly assimilated with the soil, to be wasted by exposure to the very winds from which the turnips are protected at great labour and expense. To this seemingly serious charge it ought to be answered—Where the soil is dry, manure in autumn; and where the soil is too wet, to manure at that time for turnips, use any prepared manure, principally guano. Farm manure, not decomposed, in the drills is hurtful, as it prevents the bulbs from getting what nourishment may be in the soil, to a considerable extent. Where the object is to prevent running to seed, when spring gets advanced, carefully tail before laying, lest the dry winds of spring should dry the soil, so as to deteriorate the bulbs to some extent from prime condition. Before laying, sow common salt (broadcast will do); some will fall about the bulbs, some will be gathered to them by the plough moulds, and what remains on the surface will do good rather than harm. Should the object be to preserve a quantity for hens and pigs during the summer, select as cool a spot as possible; carefully remove diseased bulbs and tops, not only covering with earth, as in the usual way of pitting, but throwing in turnips and earth, time about, while the store is forming—of course finishing with the latter. Since speed in storing turnips is of the utmost importance, farmers ought to see to keeping the roads under their own charge, and for their own carting exclusively, in tolerably good repair, as good loads compared to imitations make an important difference. To use an expressive, though at present strange-sounding term, there must be a "neep hairst" (turnip harvest), before the rest of the crop can play its proper part in bringing flesh meat more within the reach of the labouring population. The supposed difficulty in obtaining hands deters many from thinking seriously of storing.

PROFITABLE FEEDING OF ROOTS.

By Mr Spooner.*

R SPOONER said this subject had been brought about in consequence great superabundance of the root crop ear, and also on account of the scar- stock, particularly sheep, and those ere in the habit of keeping the latter ooking about them to see where they be enabled to make a profit. It had aid that the dearness and scarcity of would have a bad effect, but he could lp feeling there would be still some s, they might depend upon it, the love tton still existed in this country. Then, their skins were of more value. He t the value of the skin of a good teg spring would be nearly a sovereign, ough they did not directly get paid for it was done indirectly. Therefore ust not think of entirely plonghing in ot crops as manure, if they could make profitable use of them. Therefore ught that would be sufficient to war- im in bringing forward "The Root —What shall we do with it?"

RELATIVE PROPERTIES OF FEEDING STUFFS.

could not do better, although at the going over the same ground again, ring forward the relative properties of rious feeding stuffs, as it was very ne- y they should have clear ideas of their nt constituents as food, so as to com- he one with the other. They would he analysis of swedes, linseed-cake, ther foods, and then shew the pro- of their constituents. In foods there he flesh-making part, the part which ed the temperature in the body of the , kept it warm, and furnished the means of respirations, and then there was the earthy part—that portion taken up from the soil, and which was returned to the earth again. The elements of food were separated into three divisions :—the earthy part contained the phosphates, and nourished the bone; secondly, the nitrogenous, or flesh-making division; and thirdly, the carbonaceous part, such as starch, sugar, &c. The albuminous part was called the nitrogenous, because it contained nitrogen which was found in the atmosphere, to the extent of four-fifths, and it was at all times an important and valuable part in manure. The analysis shewed that carbon in sugar was about 42 per cent., in starch about 44 or 45. They would thus see that, as a nourishing food, starch was richer than sugar, nearly 3 or 4 per cent. But still sugar was the more valuable, because while starch was insoluble sugar was readily dissolved. Carbon was about 41 per cent.; hydrogen about 6 or 7, and oxygen from 51 to 52 in sugar, while in starch it was only 59. In oil, which was richer in quality, we find 76 or 77 of carbon, hydrogen 12, and oxygen 11. The great distinction in oil was that it contained very little oxygen, and a considerable quantity of carbon, and it thus became a most valuable part of food, because it was more readily converted into fat in the system than any other constituent. It was also more valuable in keeping the animal warm than the others. They could readily understand how the greater part of the food was taken up by the animal for the purpose of keeping up the warmth, for in the winter, when it was perhaps 32 deg., or below freezing point, it was essentially necessary that there should be fuel or food enough which would raise that temperature up to 98 or 100 in the animal. Their experience shewed them that of the nourishing food given to an animal not more than 10 per

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d before the Botley and South Hants Far- lub.

cent. was taken up and utilized in the system for the growth of the body.

THE VALUES OF MANURES.

Then there was another thing which people formed very different ideas upon, and that was the various values of manure. The manuring value of linseed cake was £4, 10s., wheat 35s., barley 37s. per ton, and then, again, turnips were 4s. per ton. It appeared to some that there must be great doubt about the value of the manuring properties of these articles of food, and that it looked like an attempt to cram and humbug people. However much they might differ in opinion on the matter with reference to the different values as food, there could be but very little doubt respecting that part which enters into the composition of manure. They could very easily ascertain what amount of ammonia existed in various manures, such as guano, nitrate of soda, sulphate of ammonia, and other things, and they would see that the valuable properties of guano were owing to the ammonia it contained, which was something like £70 or £80 per ton. The great value of guano was because it contained such a large amount of nitrogeneous elements—and fourteen parts of nitrogen were equal to seventeen of ammonia. If they took up turnips or swedes and went into the nitrogenous matter they contained, they found their value was about 4s. per ton as manure. The phosphoric acid was only about 1 per cent., which on that account did not make them very valuable, and if they added the amount they would see that 4s. per ton was about £4 for 20 tons of swedes per acre. The question of ploughing in the crops was somewhat serious, especially when they had to deal with the roots, but they all knew that the greens of mangold wurtzel and swedes decomposed with much greater readiness than the bulb. The value of the greens for manuring purposes was nearly double that of the bulb—he meant in proportion to the weight—that was taking 6 tons of greens per acre, they were equal to something like 12 tons of bulbs. This was was a strong fact, and a very strong argument to shew that this year all greens should be left to be ploughed in as manure. Last year the roots were very valuable, inasmuch as there was a great scarcity of them, for then 1 ton of roots was equal to more than 2 tons of roots this year. About six weeks or two months ago he was in Scotland, in the Lothians, and he had a conversation with many of the farmers. He talked to them about their root crops, and particularly about those of this year, and he asked them what value they attached to the greens. They said that they sometimes sold their roots to the cowkeepers, and offered £2 per acre to allow the greens to remain on the land, and they universally refused to part with the greens. In the Lothians, the greens were very abundant, and as they contained a large body of food, they were cherished by the cowkeepers, and they refused to take the £2 per acre, thus shewing the importance and value attached to them. The fact was the greens contained double the quantity of nitrogen that the bulbs did—that was, in proportion to their weight. If they took up the analysis of swedes, they found there was almost 90 per cent of water, while of albumen there was only 1 per cent., sugar and other carbonaceous properties about 5½, woody fibre 2.44, and minerals .63. This shewed, by entering into calculations, that they were not of so much account for their manuring value. The quantity of water they contained was a great drawback when they compared them with some other feeding stuffs. If they estimated their value as in concentrated food, such as linseed cake, they would find that the value of 1 ton of swedes was something like 16s. 6d., while the value of swedes for manuring purposes was only 4s. 3d. If they compared the residuum from swedes, they would find that their great drawback was the large amount of water they contained. Experiments were tried with five sheep, which ate on an average 23 lb. of chaff per week, or 3 lb. 4 oz. per day, and they drank 5 lb. 11 oz. of water per day, or 40 lb. per week. Others consumed 18 lb. of hay, and 7 lb. of beans, and drank 43 lb. of water per week, or 6 lb. 2 oz.

ıy. He wished to point out to them, he water was only equal to nearly 7 lb. edes, and this would shew that when were given in large quantities to sheep— they were given them *ad libitum*—they l see what a large quantity of water they into the system. The sheep by eating ɔots to excess, took up four times the tity of water they required or there was ion for, and it did them no good. He l ask them, as men, how they would like they were forced to drink thrice the : than they knew would do them good?

UE OF FEEDING STUFFS: SUGAR BEET.

e would shew them that by giving sheep ɔundance of roots they would not gain ıuch flesh as they would if given with nutritious food. He thought, therefore, 'as justified in saying that while there questions as to what should be done the bulbs, he would advise them to cut ıe greens and plough them in as manure. 'as also this year most desirable to pit oots as much as possible, for after they kept some time they would lose 10 per of water, and then they would be quite aluable if, after all, they had to plough ı in. They would thus get the roots : nutritious by the loss of this water, and ent the starchy matter from being con- d into woody fibre. These were points h were worthy of being reflected upon. ight be said by some that, as the feeding e of grain was only £1 to 30s. per ton, ed cake was not much more, then why ld they use the latter? He could shew ı that the cake would bring them in most ey in the end, and this would be shewn ıey compared the value of the manure. y would find that if they paid dearer for rticle and it was richer in manuring pro- ies, there would be a gain by buying the er. Thus it was that decorticated cotton nut cake were so valuable on account of r manuring properties, because the albu- ɔus properties were about 40 per cent., e rape and linseed cake contained about ır 29, and grain about 13. Thus it would een that these analyses were of great importance, as they shewed that that which cost more in the original form was richer in flesh making and manuring properties than that which cost less money. And this led him to speak of another matter, and he did so with more authority, for, for several years past, it had been grown with advantageous results in other districts—he alluded to the Silesian sugar beet for the manufacture of sugar. He would now explain why it might be desirable for the members of that club to take it up and cultivate it. Mangold wurtzel was a crop which was grown in very large quantities, and was valuable on account of the sugar it contained. They would find that if they took beans and oats, they were much more valuable in consequence of the sugar and starch they contained. The animals which consumed barley and oats took up a large amount of starch, which was converted into fat, and thus it was that pigs got much fatter on barley meal than they did on anything else, and this was due to the large amount of starch rather than the small quantity of sugar it contained. Sugar was soluble and easily digestible, and therefore it was that which made the locust bean so valuable. If they were fed on this alone, it would not be found to be very beneficial in sustaining life, but when added to other things it improved the quality of the food, being savoury and soluble. Dr Voelcker, in a paper sent to the *Journal* of the Royal Agricultural Society, with reference to water, shewed that there was 89 per cent. in the common mangold, and 84½ in the Silesian beet: and therefore the latter contained 4½ lb. more of nutriment in the room of water. Of sugar, there was 5½ in common mangold, and 9 to 11 in Silesian beet. In albuminous matters there was not much difference in value between the two. Woody fibre was 3 in the common mangold, and 3½ in the Silesian beet. In minerals it was about the same. In various places, efforts had been made to convert the sugar beet into sugar, and a factory had been established in Suffolk for that purpose, the success there being very fair. The price given for it at the factory was £1 per ton, and the pulp might be had back at 12s. per ton afterwards. Analysis shewed that, after the water and sugar had been got out, the pulp was much more valuable than the root as manure; there was a difference in the albuminous compounds of 2½ per cent., and ¾ of a ton of beet would be equal to 1 ton of mangold. Of crude fibres, the pulp contained 24 per cent. It had been shewn that when 2 tons of roots were converted into 1 ton of pulp, the lattter would be quite as valuable per ton as the former in their original state. The question was, whether 24 per cent. crude fibre was of more value for feeding, than the displaced sugar; and the results proved more favourable. It was grown in large quantities on the Continent, and it did not interfere with the condition of agriculture. In fact, it increased it, and much more corn was grown than otherwise. In this country it had not been attempted in many places, but he thought a profitable crop might be produced. The question was whether it would be worth while for them to grow it if a market was open to them. Beet was of value for feeding, because it contained more solid matter and 25 per cent. less of moisture than mangold. One ton of sugar-beet was equal to 1¾ ton of mangold wurtzel.

THE ADULTERATION OF MANURES AND FEEDING STUFFS.

AT the Monthly Council Meeting of the Royal Agricultural Society, the following interesting chemical reports were submitted:—In his annual report, Professor Voelcker states, that, whereas in the year 1870 the number of analyses furnished by him were 115 in excess of those for 1869, this year the unprecedented number of 730 analyses, or 150 more than in 1870, had been referred to him.

The following is a summary of analyses made for members of the Society from December 1870 to December 1871:—

Guano	78
Superphosphate, dissolved bones, wheat manures, and similar artificial manures	202
Bone-dust	36
Refuse manures	36
Nitrate of soda, sulphate of ammonia and potash salts	31
Marls, limestones, fireclays, and other minerals	20
Soils	44
Oilcakes	212
Feeding meals	24
Vegetable productions	12
Waters	36
Examinations for poisons	4
Total	730

Dr Voelcker states that several of the samples of manures sent were found all but worthless, and he reiterates his advice that purchasers of artificial manures should always obtain, if possible, a guarantee by analysis, of their composition and fertilizing qualities. The practice of buying superphosphate of a guaranteed strength is, he adds, gaining more and more ground, and he recommends the stipulation that a proportionate deduction be made if the bulk of manure on delivery do not contain the guaranteed per-centage of soluble phosphates.

With respect to bones, they have become scarce and dear, and few manufacturers supply genuine dissolved bones; nine-tenths of the bulk of what is sold as dissolved bones is a mixture of ordinary superphosphate with more or less of bone-dust. Such mixtures should be sold under a name which expresses more fairly the real character of the article.

Most of the samples of bone-dust analyzed in 1871 were pure, and of good quality.

Sulphate of ammonia has risen much in price this year, the present price being £21 to £22 per ton, and it is very necessary to have the per-centage of ammonia guaranteed, which in the first quality should be 25 per cent., and in the second not less than 23.

quality of the guano from the Guanape ; has not improved; three-fourths of nples of guano analyzed by Dr Voelck- ·e from the Guanape Islands, and the ty were too wet and lumpy for direct ation to the land. Many samples con- from 23 to 24 per cent. of water, and w more than 10 per cent. of ammonia. mer years, such guano would have been s sea-damaged, varying according to the ic value of the cargo. During the last ı, Guanape Island guano has all been t one uniform price, and importers not allow samples to be taken of the of the various cargoes, so that analysis be made before purchase. The sales no have therefore fallen off very much. ere is reason to believe that the Peru- guano which will be offered in future, the Government sales in this coun- ·e undertaken by the new contractor, e of a superior character. The sup- f good guano, Dr Voelcker adds, is greater importance, because, whilst hatic fertilizers are being constantly ered, and the supply from phosphatic and minerals is practically inexhaustible, urces from which ammonia can be ob- l are limited. The supply, therefore, ano from the Ballestas Islands, which e looked for next year, and samples of Professor Voelcker has already ana- will be most welcome.

respects feeding cakes, the Professor calls attention to the adulteration of d cake with earth-nut cake ; and of rape including green German rape cake, nustard seed.

e or six cases have been brought under otice, in which decorticated cotton cake lleged to have caused the death of sheep ambs : as, however, some of these cakes of a superior quality, and none of them ined any poisonous ingredients, it is oelcker's opinion that the animals pro- partook too freely of the cake, and not digest the large proportion of nitro- us compound contained in good cotton and he suggests the admixture of Indian or some similar starchy food.

Out of the thirty-six samples of water sent for examination, Dr Voelcker found many largely contaminated with sewage, and he earnestly invites attention to the serious injury which may be produced to health by the use of such impure water.

The following are the papers contributed by Professor Voelcker to the February and August numbers of the *Journal* for 1871 :—

1. On Sugar Beets and Beet root Distillation.
2. On the best mode of preparing Straw-chaff for Feeding purposes.
3. On Field Experiments on Root crops.
4. On the Composition and Nutritive Value of the Prickly Comfrey (Symphytum asperrimum).
5. Quarterly and Annual Reports.

The following is the quarterly report of the Chemical Committee :—

1. Dr Voelcker reports the analyses of three samples of guano sent to him by Mr H. W. Hollis, Estate Offices, Keele, near Newcastle, Staffordshire, in May 1871.

These three guanos were found to have the following composition :—

	No. 1.	No. 2.	No. 3.
Moisture	7.56	7.02	15.55
* Organic matter and ammoniacal salts	21.67	21.91	40.25
Phosphate of lime	14.85	15.34	23.06
Carbonate of lime	9.67	10.31	—
Alkaline salts	8.08	7.20	6.06
Insoluble siliceous matter	38.17	38.22	15.08
	100.00	100.00	100.00
* Containing nitrogen	4.56	5.01	9.55
Equal to ammonia	5.54	6.07	11.59

The prices of the three samples were—No. 1, £14 ; No. 2, £12, 15s. ; No. 3, £16.

The first and second samples are adulterated, for both contain as much as 38 per cent. of sand, and about 10 per cent. of carbonate of lime (chalk) ; and the one yields only 5½ per cent. of ammonia, and the other 6 per cent. of ammonia, in round numbers.

The composition of these two samples is pretty much the same, the second being slightly better than the first, although it was sold for 25s. less money per ton than No. 1. The third sample is genuine guano, but of an inferior character, inasmuch as it contained 15 per cent. of insoluble matter and yielded only 11½ per cent. of ammonia. Such guano is not worth £16 a ton, and the adulterated samples, No. 1 and No. 2, sold respectively at £14 a ton and £12, 15s., were not worth more than £8 a ton.

Dr Voelcker wrote for the names of the sellers of these guanos, but obtained no reply in answer to his inquiries.

2. A sample of artificial manure, sent by Mr J. Reeve, Snetterton Hall, Thetford, on analysis was found to have the following composition:—

Moisture	15.53
*Organic matter	25.06
Oxide of iron and alumina	10.35
Phosphate of lime	1.70
Carbonate and sulphate of lime	16.74
Magnesia and alkaline salts	2.01
Insoluble siliceous matter (sand)	30.61
	100.00
*Containing nitrogen	.87
Equal to ammonia	1.05

This artificial manure, it will be seen, contained only 1¾ per cent. of phosphate of lime, and yielded only 1 per cent. of ammonia. It contained 30½ per cent. of sand and a large proportion of oxide of iron, alumina, carbonate of lime, and similar worthless materials.

No information could be obtained respecting the names of the vendors, or the price of the manure, which hardly deserves the name.

3. Mr Edward Taylor, Whitton, Leintwardine, sent a sample of manure, which he purchased as genuine dissolved bones.

This manure on examination was found to contain no more than 10 per cent. of green loam at the most, and consequently was not genuine dissolved bones. The name of the dealer of these so-called dissolved bones could not be obtained.

4. Dr Voelcker had previously reported on the composition of a sample of fish and bone manure sent by Mr Nathaniel Baskett, Braines Hall, Wetheringsett, Stonham, Suffolk, as follows:—

Moisture	11.98
*Organic matter	8.88
Phosphate of lime	3.43
Sulphate and carbonate of lime	51.06
Magnesia and alakline salts	2.70
Insoluble siliceous matter (sand)	21.95
	100.00
*Containing nitrogen	.31
Equal to ammonia	.37

This manure was sold at £5 a ton, but is scarcely worth 10s. a ton, delivered free of cost on the farm.

In answer to the inquiry made as to the vendors, Mr Baskett wrote on July 6:—

> You applied to me for the name of the manufacturer of some fish and bone manure I sent you for analysis a short time since, and which you valued at the low sum of 10s. a ton. I beg to state I had it rom H. Marshall & Co., Wivenhoe, Essex; also from the same firm the guano sent to you at same time for analysis, and which you stated to be adulterated, and not worth more than £7, 10s. a ton, and for which I paid £12, 15s.—I am, yours faithfully,
>
> NATH. BASKETT.

5. Mr Baskett sent again in July two samples of manure, marked No. 1 and No. 4, which were both sold to him at £5 a ton cash, delivered by Messrs H. Marshall & Co., Wivenhoe, Essex.

The two manures had the following composition:—

	No. 1.	No. 4.
Moisture	7.51	9.68
* Organic matter	16.25	11.85
Oxide of iron and alumina	1.40	.89
Phosphate of lime	2.46	5.72
Carbonate and sulphate of lime, &c.	67.15	63.46
Insoluble siliceous matter	5.23	8.40
	100.00	100.00
* Containing nitrogen	·53	·49
Equal to ammonia	·44	·59

No. 1 manure was scarcely better than the sample of fish and bone manure which Mr Baskett sent before, and which was valued at ton in comparison with Peruvian

manure, it will be seen, contains but hosphate of lime, and yields only ½ t. of ammonia.

4 is very similar to No. 1, but some- cher in phosphate of lime, and worth 7s. more per ton than No. 1. Both anures consist principally of gypsum rbonate of lime or chalk.

he next case is a sample of blood and anure, which was sent by Mr T. H. rs, WatercombeFarm,near Dorchester, ates that it was manufactured by Messrs e Brothers, near Weymouth, and sold a ton. On analysis its composition nd to be as follows :—

isture	22.72
anic matter	19.97
sphoric acid	1.82
de of iron and alumina	11,59
e, carbon, and sulphate	8.85
alies, &c.	5.73
d	29.32
	100.00
taining nitrogen	.88
al to ammonia	1.07
al to tribasic phosphate of lime	3.97

so-called blood and bone manure, it seen, contained only 4 per cent. of osphate, and only 1 per cent. of am- and as much as 22¾ per cent. of moisture, and 29 per cent. of sand. Dr Voelcker reported it to be worth not more than £1, 10s. a ton, but Mr Saunders thinks £1 a ton.

In the course of their inquiries, the Chemical Committee frequently find that the vendor agrees to abide by the analysis of Professor Voelcker, and so, the purchaser being satisfied, there is no opportunity for further investigation. Two samples of cake, for instance, were submittedto Professor Voelcker, one, stamped pure, contained seeds of some twenty different weeds, and was made of very dirty seed. Another contained castor-oil beans, but the purchaser wrote that he was in correspondence with the vendor, and did not wish to have any further analysis.

In presenting their annual report to the Council, the Chemical Committee beg to observe that they have had very serious responsibility thrown upon them in consequence of the publication of Dr Voelcker's analyses in their quarterly reports. The Committee offer their sincere thanks to the Council for the support they have received, and the confidence that has been reposed in them. They are thoroughly satisfied of the good that has been done by these publications, and they trust that, while continuing them as usual, the experience they have acquired may render the reports equally valuable to the public, and at the same time not provoke any legal proceedings.

REARING OR FEEDING OF CATTLE.

E Rearing and Feeding of Cattle is a subject which has often occupied the n of the best stock-owners; and it is ion which at the present season of the more than usually interesting. This ime when those who are good feeders, o have got up the cattle they have r have fed, into the best condition, are l to shew them, for the delectation of seurs, to their own advantage. For Christmas, with all its merry-making, and all its powers of consumption of roast-beef, has just passed, when the poor shared the luxury of the staple dish of Old England, along with the wealthy.

The benefit to prize-takers arises in this way. They do not, as a rule, we believe, receive nearly the amount of money they have expended on show-cattle before they bring them out into the fine symmetrical shape, with flesh evenly laid on, in which we see them; but then they reap their reward by having their names brought prominently before the public, and securing, when they come into the market, the highest prices for their other cattle, which have not been fed so luxuriously. One beast costing perhaps in its treatment double or treble the amount the butcher pays for it, is set off against the high prices which ordinarily well fed beasts bring, after their feeders have been recognized as successful competitors at the Birmingham or Smithfield shows. Feeding one of these exhibition cattle is, on the part of its owner, really like casting his bread upon the waters, that it may return after many days; and return it assuredly will, in increased bulk, if skill and perseverance are exercised. Both elements of character are essentially neccessary, however, before the success which begets profit can be obtained.

We well remember the time when Mr M'Combie, who is now regarded as one among the chief feeders of the day, was a losing exhibitor. And how did he succeed in placing himself in the first rank of those who supply the primest beasts to the market? Simply by shrewdness and perseverance, and these concentrated entirely upon the breed of his native country. He was beaten year after year by the English breeds, but he was not daunted. In his vocabulary there was on such word as *fail;* and he came to the top of the tree in the end, as his many cups and medals sufficiently testify.

According to Mr M'Combie himself, his success was due entirely to his minute observation of the prize-winners against which he had unsuccessfully competed. He studied every point, noticing particularly those in which the English cattle excelled the Scotch, and came to the conclusion that he had been beaten, not because the Scottish breeds were inferior to the English, but because he had been imperfectly acquainted with the specialities in cattle which pleased the judges, and not thoroughly well up in the proper system of feeding. To note his mistake, was but to rectify it. "I selected," says Mr M'Combie, "the animals best fitted for exhibition at Baker Street, I doubled, I tripled, I quadrupled, the quantity of cake allowed to my feeding stock. I attained the object of my ambition. The English agriculturists always maintained that a Scot would never take a first place in a competition with a shorthorn, a Hereford, or a Devon; I have given them reasons for changing their opinion."

The success which followed upon Mr M'Combie's practice is open to all who pursue a similar course.

But it is not about prize animals that we specially wish to speak in this article, it is rather of that great majority of the bovine race, which butchers like to purchase, and out of which their owners make profit. Whether shall we rear or feed cattle, is a most important question, and one which farmers have been anxiously studying for many years, and more particularly now, when disease is so prevalent. In some districts it pays the farmer best to sell off his stock young; in others it is greatly more profitable for him to buy in and feed.

The subject has recently been discussed in a very practical way at the Formartine Club, in Aberdeenshire, by practical men. From Aberdeenshire, we get the finest beef that comes into the Christmas market—therefore the opinions of those who feed and rear them are of much value in guiding the practice of others under like conditions.

Mr Cochrane, of Little Haddo, who is well-known as a breeder of shorthorns, opened the discussion, and in the course of his remarks, speaking of his own district, he said:—

> There are farms of superior soil, better adapted to feeding off cattle than for rearing and feeding the same. On such farms, the purchase of two-year-old cattle in the spring of the year is generally practised, these to be fed on turnips, and perhaps oilcake, till the grass has arrived at a full bite. If heifers are purchased in forward condition in the spring, they may be got ready to sell in the month of June off the grass; if stots are bought in spring, they should be grazed during the whole season, then tied up early in the end of the year, giving them tares nearly ripe, and a few turnips; then a full allowance of turnips with oilcake, or other feeding materials in mixture, will be necessary to have them ready for the Christmas market. On farms where the greater part of the land is good, feeding

ttle may pay best. But this system has its draw- icks. Store cattle are now difficult to be had, and e price has greatly increased within the last few years.

Mr Cochrane went on to say that there as great difficulty in obtaining store stock om the home counties now, as the rearers n the north were feeding their own stores, nd the only supplies were from Orkney, rom England and Ireland, and from Hol- and, from all of which places disease was mported. Mr Cochrane continued :—"My pinion is that parties purchasing cattle and eeding the same ought to keep very few reeding animals, as the risk is very great when pleuro enters amongst breeding stock. I am afraid that Aberdeenshire will lose its ame for producing the prime beef so much prized in the London market, if breeders are to feed English or Irish cattle."

He came to the conclusion that breeding and feeding should be the practice, now that purchasing stock was so dear and so dangerous, and gave his reasons how that could be accomplished with profit. In substance, they were first to have bulls of undoubted purity of pedigree—a very good recommendation—well fleshed, and active. The difficulty of getting cows to breed in some seasons, suggested the question :—

Are we pampering our cattle too much, and spoiling their breeding powers? The shorthorns and crosses come early to maturity, and have a greater aptness to run to fat than most other breeds of cattle; and as the greater proportion of cattle in this district are shorthorns or crosses, we must guard against keeping breeding stock otherwise than in a breeding condition. In rearing cross stock for feeding purposes, the cows, if calving early, will have the oldest calves ready to wean in May, and fit to be turned upon the grass. Another calf may then be put to the cow; or should you prefer, you can allow two calves to suckle together for a longer period. I think if a little more attention were paid in breeding to the milking properties of a cow, a good strong constitutioned cow would easily foster two calves each season. If calves are to be reared from the pail, give them new milk for at least three months, afterwards skim-milk with boiled linseed, or linseed steeped in boiling water until it becomes a jelly, adding peasemeal or Indian corn finely ground, another month or more. After the calves are weaned, be careful never to allow the *calf-flesh* to get away from their backs, as it is not so easily put on again: in fact, no animal should ever be allowed to go back, but to be always improving.

Mr Cochrane's opinion, however, was not shared in by the majority of the meeting, who, in the words of the Chairman, Mr Davidson, Mains of Cairnbogie, thought "that it was best to breed one-half, and buy in the other half of their cattle. They would soon have to solve the question, whether, by buying in foreign cattle, they could keep up the character of their stock in the London market, and he hoped they should, at all events, not allow the character of their fat stock to deteriorate."

The mode suggested by Mr Cochrane, it was urged, was too expensive, and that safety could not be secured thereby, a decision, we are inclined to think, not far wrong.

THE PRACTICE OF FEEDING ANIMALS.

By Dr Hopkins.*

YOU may remember, gentlemen, that I previously told you that the elements of which flesh and fat are composed consist of four essential principles, which, by their combination or re-union, constitutes nutritious matter properly so-called. 1. A nitrogenous or azotised matter, such as albumen, caseine, gluten, substances, which are, as far as is known, the foundation or origin of flesh; 2. An oily or fatty matter which approaches more or less closely to fatty bodies in general; 3. A substance having a benary composition, such as sugar, gum, fecula; 4. Certain salts, particularly phosphate of lime, magnesia, and iron. The fundamental principle that animals find the several substances which make up their bodies, ready formed in the substances they consume, seems very well calculated to assist the practical farmer in managing the food of animals upon his land; for if flesh, fat, and bone exist all but ready formed in the food, it is obvious that the best kind will be precisely that which under the same weight contains the largest quantity of the various matters of the organization. It is a great point to ascertain the amount of nitrogenous matter contained in the food given to animals. The experiments of Professor Majendie, under whom I studied, have shewn that substances which contain no azote, such as sugar, starch, oil, will not support life; on the other hand, it is ascertained that the quality of alimentary matter, flour for instance, increases with the amount of gluten which it contains. It is because the seeds of the leguminous vegetables are richer in nitrogenous principles—that is, in flesh; that they are also more highly nutritious than the seeds of cereals. Several considerations, therefore induce me to conclude that the nutritious principles of plants and their products reside in their azotized principles, and consequently, that their nutritious powers are in proportion to the quantity of azote they contain. Yet, I am far from considering that azotized principles alone are sufficient for the nutrition of animals; but it is a fact that every azotized vegetable and nutritive substance is generally accompanied by other organic and inorganic substances which concur in nutrition.

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* Read before the Carmarthenshire Farmers' Club.

HEAT AND FAT PRODUCING MATERIALS IN ANIMALS.

Let us see, then, how the common principles found in vegetables resolve themselves into two classes, one destitute of nitrogen, the other containing it. The former, to which I shall first refer, may be called the non-nitrogenous elements of food or the elements of respiration and the producers of fat. Those bodies in vegetables which contain no nitrogen are fats of any kind whatever, oil, starch, gum, mucilage; and various kinds of sugar. These bodies, I say, contain no nitrogen or azote; they are merely adapted for the production of fat or for the purposes of respiration. We take in by every inspiration a considerable amount of oxygen, which, after acting upon the carbon and hydrogen of these non-nitrogenous materials, passes out again in a consumed state. Let me here mention the amount of carbon consumed each day by various animals. Man consumes on the average 12 to 14 ounces, and there is required for that consumption 37 ounces of oxygen. The horse consumes 97 ounces, and requires 258 ounces of oxygen, and the cow consumes 70 ounces of carbon, and demands 186 ounces of oxygen. You clearly see that our animal economy requires that constant supply of heat producing materials should be brought into the system and that a constant supply of oxygen should be taken into the lungs in order that the body be kept at a proper temperature. Now, after the temperature which is necessary for the animal economy has been arrived at, you have left the excess of food beyond that which the animal requires for heating purpose. What remains of the oil, the starch, the gum, the mucilage, and the sugar, after the necessary production of heat, is formed into fat. The excess of food Nature places upon the muscles in the form of fat, in order that if the animal be subsequently, through any misfortune, deprived of food, its days of feasting may in some measure minister to the necessities of its days of fasting. Of course, under such an arrangement, it is essential for fattening purposes, that the animal should be kept at a proper temperature, otherwise no fat can be formed from these materials. Warmth and repose, with absence of all resources of excitement, is very necessary to the production of flesh and fat in all animals, together with a circulation of air, necessary to carry off the carbonic acid gas which is constantly expired, and which, if inhaled over again, even in the proportions of from 2 to 5 per cent, is positively deleterious. I shall not do otherwise than name the chief nitrogenous substances used in the feeding and fattening of animals, such as hay, potatoes, beet, turnip, wheat, maize, oats, wheat straw, oat straw, clover hay, peas, haricots, beans, rape and d cake. If great accuracy be required, tock should be weighed weekly, the food rink daily, and a reasonable number of als, say fifteen to ten, pitted against other, carefully watched, housed, &c.; will then find whether and to what ex- you can rely upon the claims of any ance as a flesh-making material.

FEEDING AND FATTENING OF ANIMALS.

great variety of experiments have for g time been carried on for the purpose sting certain methods of feeding. Be- n the external forms of animals and the al organs essential to life, there is the obvious and intimate connexion. In d cattle a broad and deep chest is the ndication of ample lungs and a good al constitution. The pelvis or bony re formed by the rump and haunches to be spacious in the females; a small is generally the indication of a good Horns in our domesticated animals be regarded as objectionable rather seful, and by adopting measures which o repress their growth, we undoubtedly the production of flesh and blood. trength of the animals depends far more degree in which their muscular system eloped, than on the mass of their bones; besides, flesh and not bone that has in the butcher's eyes. So that it is the 's business by all means to strive after ate but well-covered skeleton. Animals have been indifferently fed when , have often the bony system very dis- tionately developed. Two modes are lly followed with a view to improving ternal shape of domestic animals, one se consists in only breeding from s of the most faultless forms of the race, and generally of close degree of d; another, crossing females with the of a neighbouring race, each possess- the greatest degree the qualities which ld desirable to transmit to the future I cannot help thinking that, although g in and in renders them handsomer re likely to take on flesh for a time, o not think that, judging from analogy, the system can be pursued for too long a time without judicious crossing; at any rate, all of you know that, other things being equal, the shorthorns are not so hardy in this climate as the blacks, that have from time immemorial been located here. It is a fair matter for discussion whether the black or Castlemartins can or cannot be considerably improved by care and intelligent attention. Thaer fixes 13 lb. as the quantity of hay per day which a cow requires for her maintenance in perfect condition, and if the animal be in milk he allows as many as 22 lb. to 33 lb., but the ration must vary with the weight of the animal. Mr Perrault, another foreign writer, states 27 lb. as the allowance for a milch cow weighing about 880 lb., he having in his experience found that an animal in milk required about 6¼ lb. of hay for every 220 lb. of living weight. A very large ox or cow, relatively to its weight, requires less food than an animal of smaller dimensions. And this circumstance is a grand argument with those breeders who are in favour of very large cattle. They say that if a large ox consumes more than a small one, still the increase in consumption is by no means in the ratio of the increase of weight. I say that the real difference is owing to the quieter disposition of the animal, the vessels going to support the flesh or fat being larger, attained by the before-mentioned careful crossing, so that some breeds have by such a system attained the faculty of laying more upon their backs, and others again more in the adipose tissues within.

THE RATIONS OF CATTLE, HORSES, AND PIGS.

Time will not permit me to shew here the tabular account of feeding rations, whether for calves, neat, or feeding cattle. Suffice it to say, or sum up, then, it may be said that for every 100 lb. of living, neat cattle require for plain keeping ¾ lb. of meadow hay; when labouring, 2; when in milk, 3; growing rapidly, 3½, which ought to be given with great regularity, and about three times a-day, constituting so many meals which, however, are well divided, the whole quantity for each meal not being placed before the animal at once. This precaution is particularly necessary when the allowance consists of green fodder. In fattening cattle it is, perhaps, of more importance than in general feeding, that the provender should be distributed regularly; plenty of soft litter and the greatest attention to cleanliness aid materially in fattening. The cowhouse ought to be dark—in a word, all the conditions ought to be combined which conduce to sleep and secure freedom from disturbance of every description. The older the cattle, up to eight years old, the quicker they feed, because younger animals require both longer time and more food, for the reason that they are forming both flesh and fat, and otherwise developing themselves. Cattle that have worked, feed soonest of all. In fattening during winter, which is done almost exclusively with hay in this and some other countries, an ox weighing 748 lb. upon 40 lb. of hay per day will increase by about 2 lb. daily. According to Mr Low, an ox weighing 770 lb. and consuming about 2223 lb. of turnips per week, if he thrive, will gain in this same time about a stone, 14 lb. weight, admitting that the equivalent number for turnips is 676. I find that the ration of hay for this allowance comes out 47-8 lb. having produced exactly 2 lb. of increase. In attempting to make animals too fat, a great loss is incurred, because after a given amount of fatness, the greatest part of the food passes off in the dejections unassimilated. It is needless for me to add that oil-cake and corn are great adjuvants in fattening and lessen the time otherwise required. Mr Anderson has found that an ox which is not absolutely lean will give for every 100 lb. of his absolute weight of marketable meat, 53½ lb.; an ox somewhat fatter, 55 lb.; and one completely fat, as many as 61 2-10ths lb. All of you are so well acquainted with horses that I need not attempt to enlighten you either as to their breed and qualities for agricultural pursuits or for the hunting field; everybody takes so much delight in that truly noble animal that before he leaves his boyhood, he mostly becomes well acquainted with the character of his horse and his requirements. I will merely add that the daily allowance to a horse of middling weight and doing ordinary work, may be regarded as good when it consists of hay, 8.2 lb.; oats, 7.2 lb. Or substituting for hay, furze *ad libitum*, but for fast work or the hunting field, half as much again of oats, with 2 lb. beans may be added to the former; green food will not do for fast work, and even the hay should be lessened. The pig is met with in all farms, and is a very necessary appendage to rural economy. Offal of all kinds that would go directly to the dunghill is turned to the very best account, whether from the dairy, barn, or kitchen garden, or the harvest field—nothing comes amiss to him that is edible; but the rearing and fattening of pigs, although frequently looked upon as a matter of course, really demands considerable attention and certain convenience of situation. The rearing of pigs in a general way may be said to suit the small farmer better than the great agriculturist. According to Thaer, the hog that is disposed to take on fat is distinguished by length of body, long ears, and a pendulous belly.. It is generally allowed that twelve weeks are required to bring a hog into prime condition, when he ought to have a layer of fat under the skin upwards of 1 inch in thickness. Sixteen weeks may be required to obtain an animal really fat; and twenty weeks to have been in the highest point that is attainable. The hog requires to be fed regularly. I have found that eight pigs which at the time of weaning weighed 114 lb. or 14.3 per head, at a year old weighed, under the ordinary food, 1320 lb. or 165 lb. per head—increase in eleven months, 150 lb. per head, but they had whey also. In fattening hogs at a year old, it may be stated, as a rule, that 6 lb. of barley meal make about 1 lb. to flesh; which may be increased considerably by other ingredients, such as potatoes.

RECLAMATION OF WASTE LANDS.

By Mr. R. E. Brown, F.G.S.*

E are told that the superficial area of this kingdom extends to 77,513,000 , and of that number, nearly 48,000,000 under cultivation, and this includes ,000 acres under woods and plantations. leaves, in round numbers, nearly 0,000 acres in a comparative state of . Much of this, we all know, is not ether a thorough waste, for much of it ces pasturage for sheep and cattle, and is a very large extent of it which is, I say, incapable of improvement at the nt time. It has been estimated that at 10,000,000 acres of this waste land could ought into cultivation by the plough, so grow grain crops, while a large propor- f the remaining 20,000,000 could be icially improved as pasturage without ing ploughed, and by the making of tions upon parts for the shelter of the and crops, and the growth of timber. r the different kinds of waste lands in this ry, these consist chiefly of moorlands, the soil is peaty loam or a sandy peat, n many cases of a sandy loam. These e boggy or peat soils, where there is ly a great depth of peat; the marshy where the soil is wet and grown over strong water weeds; the sandy com- ; lands by the sea-shore; and, finally, lands.

st, then, in regard to the moorlands in ountry. They form the chief waste of Northern Yorkshire. One proprietor , in the North Riding of this county, sses 30,000 acres of moorland, much of is fit for reclamation. I have walked nd examined a large extent of the York- moors, and I state, as my opinion, that large proportion of them could be ht to bear good grain and turnip crops, and pay the owners an ample per-centage on the outlay, which is not the least important point of the question.

INCREASED VALUE OF LAND THROUGH IMPROVEMENT.

In the years 1856, '57, '58, '59, I farmed a 300 acre farm in Inverness-shire, and part of which farm was deep peat land, extending to 14 acres. About 10 acres of this was enclosed, and this I was resolved to bring into cultivation. The improvements were commenced by opening out a ditch at the low side of the field. This ditch was made 14 feet wide at the top, sloping down on each side to a breadth of 4 feet at the bottom, where the clay was reached. This had the effect of drying the chief part of the field. Drains were placed 18 feet apart, and cut as an ordinary drain 5 feet deep. The pipes were 2½ inches, and placed on soles in order that they might not sink into the peat. The field was thoroughly trenched, and a quantity of lime was laid on the surface of gravel, to the extent of 3 tons per acre. After remaining one season without being cropped, it was in the following season sown with oats, receiving a top-dressing of bones and guano, and the result was plenty of straw to a height of 5 feet, but very few oats. It was again sown with oats in the following season, when the crop averaged 5 qr. per acre, and since then it has been kept in regular rotation with the rest of the farm, and done well. The total cost of the reclamation was about £12 per acre, and after I left the farm, it was let at an advanced rent of £25, in consequence of this reclamation. Chalk districts are capable of much improvement.

COMPARATIVE VALUE OF HORSE AND STEAM CULTIVATION.

But to turn our attention more immediately to such lands as we find in the district of

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d before the Whitby Chamber of Agriculture.

Whitby. I shall consider my second heading: the comparative advantages and cost of land by horse and steam power in the reclamation of our waste lands. It is necessary to have them deeply trenched. Intelligent farmers are beginning to find that, without deep tillage, they are at a stand-still with all other operations. Drainage does not act without deep cultivation. Manures do not give full value without it, and crops do not succeed so well in shallow cultivation, as in deep stirred land. As an instance of this, a gentleman had last season (1871) 1200 acres under sugar-beet, 600 acres under hay crop, and 700 acres under wheat, the last-mentioned standing 7 feet high in many places, and averaging 6 feet, without a lodged spot over the whole breadth. What was the cause of such fine crops? Simply because all the land is cultivated by steam power, to a depth of 3 feet. There are many acres in this district capable of being brought into cultivation, and the best way to operate on such land is this. First, see to any drainage that may be wanted, then plough to a depth say of 8 or 9 inches. Cross-plough it to a similar depth, harrow it, and get it reduced to a free, open surface-soil; then endeavour to get deeper, by putting a common plough, first to turn over a good furrow to a depth of 10 inches, and in the bottom of the same furrows bring a sub-soiling plough to open out and stir still deeper. In attempting to bring moorland into cultivation, the surface should be broken up by means of steam power, and the heath should first of all be burnt off. The land should then be ploughed to a depth of about 9 or 10 inches. It should then be cultivated—not ploughed, but cultivated with an implement for sub-soiling to a depth of 12 inches. Doing this twice over, that is, first one way and then the other, will make three operations. The land should then be harrowed so as to toss about all the rough pieces of earth and root of other plants, to shake the soil out of them, and then placed in heaps and burned, spreading the ashes over the surface. Then sub-soil to a greater depth—at least 15 or 16 inches. I have found it best to get the surface well broken and the roots burned, and ashes spread before attempting any very deep cultivation, as then you get a fine surface, and no impediment to the implement getting down. After deep cultivation, the land should receive at least 4 tons of lime per acre, mixing it with the soil by harrowing. The land will then be ready for cropping, and in all cases of moorland two green crops in succession should be taken from the land before any grain crop is taken. Both these crops should be eaten by sheep, giving the latter a liberal allowance of cake. This ensures the placing of the soil in good condition. Many intelligent farmers advocate paring and burning off the surface moorland previous to its being worked, and I confess that I have never got converted to this mode of reclamation.

COST OF RECLAMATION.

And now as to the total cost of such operations. It is difficult to give a sum as likely to suit different situations, both from the nature of the soil and the situation of the land. In one place, lime may be had at one-half the cost of that used in another, and the sub-soil may be harder in the one than in the other. I believe that many thousand acres could be reclaimed in the district at an outlay which would pay from 15 to 20 per cent. I can even shew you land in this county actually paying over 20 per cent on the cost. He proceeded to point out that in many of our fields, in all parts of the country, there was a great waste of land. Fences spread out to a most unnecessary breadth, and broad stripes of land lay uncultivated on each side of the fences, forming hotbeds for breeding insects and weeds, which prey upon the adjoining crops. Besides this, there is a great deal of land which, although cultivated, is comparatively waste through mismanagement from the want of draining, deep stirring, and manuring. Witness many of our pasture lands—parts mown, parts eaten by stock from year to year without even receiving any assistance in the way of food for grasses. Meadows and pastures undrained, unmanured, and unattended to generally, there are on every hand. I became once the occupier

adow field, which was described by
ghbours as a "nasty, sour, boggy field,
coarse grasses," and which used to do
it grew 6 tons of hay for the whole ex-
7 acres. It was first drained, and
ceived a liming of 3 tons per acre.
ar following it was manured, and 7
ere divided into two fields—one field
and the other 3 acres. The 3-acre
r the last four years has grown hay to the extent of 8 tons, per annum. This, I think, speaks for itself. In conclusion, I wish it to be understood that in advocating the reclamation of a large extent of our waste lands, I do not stretch the point too far. I do not advocate the growth of turnips on Rosebury Topping, or wheat upon Skiddaw, yet I maintain that a great deal could be done, with a profit to those who expend the money, and to the good of the country at large.

THE ABERDEEN SEWAGE IRRIGATION FARM.

E success which attended the commencement of sewage irrigation on
ital lands, Aberdeen, last year, has
l the owners of the land, the represen-
of the late Colonel Knight Erskine of
e, to lay out for the purposes of irriga-
considerable additional breadth during
spring and summer. Prior to 1871,
imperial acres were run over by sew-
ut for the past three months, some 44
ave been under such treatment. The
situated on the east side of the King
Road, between old Aberdeen and the
d was by nature admirably adapted for
the utility of town sewage as a fertil-
The soil was pretty even in surface,
ped gently to the north-east.

gh the surface was generally even, a
leal of labour was necessary before
age was conducted over it all, and
ral months this year a considerable
of hands were employed on the
The laying out of an irrigation farm
y is not the work of a day. It was done
n the principle of the larger irrigation
n the south, in patches varying in
m 1-5th to 3-4ths of an acre each,
merous main and "catch" ditches
nices interspersed. The plans on
hese operations were executed were
d by Mr Rodger, C.E., Aberdeen,
ve proved very satisfactory. On
rather elevated parts, 3 or 4 feet of the subsoil or gravel had to be removed, and in some instances deficiencies in the necessary gradient had to be made up to a similar extent. The opening, not to speak of the engineering, of so many ditches, caused a good deal of work. The main drains are substantially laid with tiles closely cemented. Ample road accommodation has been provided through the farm, which has just been enclosed by a handsome and substantial wire fence.

It is intended, says the *Scotsman*, to lay the whole farm out in grass as soon as it can be got properly prepared, and as the local demand for the produce warrants. At first an idea was entertained to some extent that sewage grass was unwholesome food for cattle, but experience has shewn this notion to be groundless. During last summer, cowfeeders in Aberdeen used it extensively, and, mixed with old hay, carters fed their horses with it. A judicious mixture of this sort was realized by the horses, and they throve well on it. There was thus no difficulty experienced last summer in disposing of all the grass at a fair price. It does not yet sell so high as in the south, but as it becomes more appreciated in Aberdeen, there is no doubt the prices will rise. Altogether, there has been about 17 acres under grass this year, including 11 acres previously run over by the sewage. A few acres of the old grass shewed deficiency of roots early in the season, caused by some of the previous year's crop rotting on the ground, and in the case of 6 or 7 acres seeded last spring, it was comparatively late in the season before the crop was ready for cutting. Altogether, however, the grass part of the farm has proved remunerative this season. The last public sale of grass for the year took place lately. On some parts of the old grass there have been five very heavy crops since May, while on the rest of it there have been four. The late sown portions have only yielded three crops, but considering the advanced date of sowing, no more could have been expected. The highest price obtained for any of the crops of grass this season was £17 per acre, while from £7 to £12 per acre has been a common rate. Five good crops of grass in one year in an Aberdeenshire climate, should be very convincing proof that sewage irrigation is very valuable, if for nothing else than increasing the produce of the soil.

When the additional ground was taken into the proprietor's hands last spring, much of it was overgrown with wild grass, and it was deemed advisable to put it under the kind of crop that would afford the greatest facilities for cleaning the land. Accordingly, about 17 acres were devoted to the growth of turnips, and 10 acres to the produce of potatoes. In the preparation of the land for these crops, manual labour alone was available, the sewage ditches preventing any other mode of cultivation. The "graip" was used in shaking and gathering the weeds, and a sort of spade in forming the drills. The potatoes were planted in drills about 2 feet wide, and the excavation for the seed was about 3 inches deep. Turnip drills were formed in a similar way, but the seed, in this case, was deposited with a machine drawn by men. The potatoes are a good crop—the tubers are not only numerous at the stem, but they are large in size and of excellent quality. Where the soil is naturally dry and good, the yield of potatoes is very heavy; but none of this crop having been sold yet, it is not well known how they may turn out financially. There is no appearance of disease.

Of the turnips, 4 acres of swedes are an excellent crop, and are expected to realize from £16 to £20 per acre. The remainder of the turnip area is devoted to the growth of yellow bulbs. Two-thirds of the land growing yellow turnips promise a heavy return, but finger-and-toe has made a good deal of havoc in the other third. There is a great scarcity of roots on a few acres, and those that are studded here and there on these ill-favoured patches are not thriving at the root. This failure is accounted for in various ways. In the first place, the soil is naturally a little wet, and in the next place, turnips happened to have been the crop grown on a considerable portion of the unproductive ground last year. That canker should appear in a second successive crop of turnips on the same field is not very surprising. With these exceptions, however, the yield of turnips is really good. Where the soil is naturally dry and not too thin, the bulbs are large and plentiful, and the tops are very long and heavy. On Saturday afternoon there was a public sale of the yellow turnips. The highest price realized was at the rate of £16 per acre, while from £12 to £15 was freely paid. The experience of the last six months on the Spital lands have strengthened the opinion of the manager, Mr Buchan, and many others, that if there is any natural dampness in the soil, irrigation will not suit. There are a few such patches on this farm, and the result is a comparative failure of any kind of crop.

It is more evident than ever that grasses are the most suitable crop for an irrigation farm, especially situated, as this one is, in an uncongenial climate and cold soil. Four or five crops of grass can be raised in one year with scarcely any labour, and only one of turnips or potatoes, which, moreover, require a great deal of costly labour. The odds are largely in favour of grass, and in these circumstances it is all the more satisfactory to the grower that the demand for it is increasing so rapidly. It is worthy of note that when the sewage was over the farm the atmosphere was very little polluted—in fact, it could scarcely be regarded as offensive to the neighbours.

THE UTILIZATION OF SEWAGE.

R BAILEY DENTON, C.E., whose name has been closely connected ıe sewage question, delivered a lecture Society of Arts, lately, on "Sewage ertilizer of Land, and Land as a Puri- Sewage." The following is a summary Denton's paper :—

: object was to shew that the fertilizing of sewage would not be fully obtained a high standard of purity was estab- and enforced, with a view to free our from pollution, thus securing the two ɔortant objects—purification and repro- ın—without loss of valuable time. aring the standard suggested by the s Pollution Commissioners with that ımended by the chemists consulted by hames Conservators, it was pointed out ıe latter being much less stringent than rmer (which is quite low enough) might o consequences which will be hereafter ted. On the Lee, the conservators have lopted any standard, but reserve judg- until the towns discharging into the having completed their purifying works, ıich time has been extended. Mr Den- xpressed a hope that some positive ı towards the establishment of standards cable to different circumstances would nmediately taken by the central local nment authority, adding that until such case we shall probably see, both in the ıes and on the Lee, the sewer authorities ʼns discharging effluent liquid into these in a condition far from pure, and that ıhabitants of the metropolis will be com- l to drink polluted water, only in a ied condition. Mr Denton stated that, the information he had obtained, he ed a saleable manure was now being factured by the mixture of the precipi- ingredients of each process with the sewage, though, up to the present time, sufficient proof had not been given that the sale would be a lasting one, and that it could be effected at a profit.

A considerable part of the paper was devoted to irrigation and intermittent filtration, each process being brought in contrast with the other. In the application of sewage to land, it was stated that local circumstances would, in future, determine whether purification of the sewage, and its profitable use should be treated as objects of equal importance, or whether purification should be a paramount object, and utilization a subsidiary one. If sufficient land for wide irrigation is not to be obtained, or, if obtained, only at a price which shall place the application of the sewage by irrigation beyond the possibility of profit, we must call to our aid the oxidising powers of an aerated soil, and regard the land more in the character of a filter, having a chemical as well as a mechanical influence, and thus realize all the advantages that can be gained from it. Land, Mr Denton stated, might be too porous as well as too stiff, and both extremes should be avoided. For irrigation he considered that the sewage from sixty-two persons, with a daily water supply of 20 gallons a-head—which is equal to 2000 tons per annum—should not be exceeded as the average quantity to be applied to each acre of and, if the sewage is to be profitably used, as well as purified; while it has been proved by some works he has carried out at Merthyr Tydvil, that the sewage of three thousand persons, which is nearly fifty times as much, may be purified by intermittent filtration through the same quantity of land, and prolific crops grown from the surface at the same time.

Mr Denton, having stated that the authorities of Birmingham had decided on adopting the same description of works, shortly described those of Merthyr, where 20 acres of land, divided into four equal parts, have been so deeply drained and deeply cultivated that the sewage of that place, which amounted in dry weather to 870,000 gallons per diem, was being purified to an extent which rendered it superior to the Thames water above the intake of the water companies. Two cubic yards of soil for every square yard of surface are made serviceable as filtering material, and he mentioned that, during the present summer at times, when the sewage was increased by rainfall to 1000 gallons a minute, the whole was filtered through half the quantity of land laid out—viz., 10 acres, being equal to 144,000 gallons per acre, or a deposit of 6¼ inches over the whole surface.

Correspondence.

MANURES AND THE MANURE TRADE.

SIR,—In the November number of the COUNTRY GENTLEMAN'S MAGAZINE there is an article on "Manures and the Manure Trade," which contains some very useful hints. But one remark calls for correction, viz. :—"That our friends in the Buchan district have *set the example* in this matter (referring to the adulteration of manures), by instituting what they have called an Analytical Association," thus claiming to be the first association of the kind. Now, the Kelso Association was established in 1858, and in evidence that it was the first local one of the kind in Scotland, I shall give the high authority of the Marquis of Tweeddale, who, in acknowledging receipt of a copy of the rules of our association, remarked, "That we undoubtedly had the credit of taking the lead in establishing a local society, which he had long considered would prove of great advantage to practical agriculture." I may remark that his lordship's words have proved correct. It has been of very great advantage to this district, and what has made it of more importance is the addition of testing gras seeds.

The rule is, that "no manures or feeding stuff shall be analyzed at the expense of the society unless a guaranteed analysis shall have been received by the buyer." And no seeds shall "be tested unless a guarantee of purity and per-centage of seeds which will germinate be also given." This rule has deterred all knavish dealers from selling to any member of the association. During the first few years there were several disputes in consequence of the quality being inferior, but latterly there has scarcely been a single case.

The funds are provided by an annual assessment per 100 acres of arable land, at first it was at the rate of 5s., now it is down to 3s.—*A. B., Kelso, December, 23d,* 1871.

[Our correspondent does not appear to have noticed that the article he refers to was quoted from the *Aberdeen Journal*. All credit has frequently been given to the enlightened energy of Roxburgshire Farmers in the important matter of having manures tested.]

The Garden.

SHADING FOR PLANT HOUSES.

IAT some economical form of shading our numerous glass houses is in de- there cannot be a doubt. Tiffany and shadings of all kinds are by no means ble. They serve at best for a couple rs, and then we have all to go to market This, indeed, is a source of expendi- hich is most irritating, and yet, while e such materials, cannot be dispensed. If we grow plants, we must have a portion of their number screened from irning rays of the sun. We want modi- ght in summer, and in our dull dark s we long for the most translucent glass, st heaven-lighted houses that the archi- an design, compatible with stability. hadings, therefore, must be temporarily p, to take down again. In any case, an economic point, we must store away appendages of summer furnishing. But he doing of this involves an additional pon the tear and wear that is going on. le fabrics of this kind wear out very y by the sudden fluctuations which they posed to. If it be a sunless wet day, linds must be rolled up soaked with ire, and continuing, probably, so for t certain periods. This accelerates the iction of the cotton fibre, and adds to ill of sundries in connexion with the ning department. Various expedients been adopted to cut at the root of this se, chief among which may be noted ntinental plan of shading by lattice-work. seemed to us so excellent a plan that we years ago, recommended its adoption. amining the houses of Messrs Thibaut teleer, some half dozen years ago, which destroyed during the seige of Paris, we that the light diffused upon the plants ather greater than less in degree than what could be had by our English plan of cotton shading. The direct rays of the sun were refracted by the parallel strips of wood —lattice-work or blinds—that were fastened together by cords, leaving about 1 inch or so between the spars. These spars would be about ½ inch thick, so that the light could play hide-and-seek in the interstices, and diffuse itself in the artificial atmosphere within. These spars, in their collective form, in fact, formed a perfect refrangible surface disturbing the direct burning rays, while it admitted abundance of that kind of light which is more favourable than prejudicial to the system of plant life. As we saw it, we deemed it a most excellent plan, but the material used was too cumbrous to be handily dealt with. It had all the elements of stability and wear, without the portability or mechanical efficiency, which it is desirable that all contrivances of this kind should in degree possess. It could not be rolled up like our cotton blinds, and therefore plants were in degree in darkness, when it would have been well to have given them more light. When the sun went down in the horizon, the blinds would have been better dispensed with; they were, in this instance, of a permanent character.

Shading for Plant Houses.

How to get over this very important draw-

back has been a theme of study for some time. At last the problem has been solved. We have now offered us, through Messrs Dick Radclyffe & Co., a shading combining efficiency with elegance and economy. We have, indeed, a perfect form of lattice-work that can be rolled up into bales with as much ease and simplicity as the ordinary tiffany. By referring to our engraving, parties who are interested will readily see how either the greenhouse or the frame can be blinded. We don't like the mechanical contrivance shewn on the greenhouse. It is rather an obsolete system to fix the rollers permanently at top, and to have the lattice-work drawn down after the *modus operandi* of an ordinary blind. It is a much simpler and cheaper plan to have a moving roller let down with a cord and drawn up with a cord on a "barrel" at the end of the rol
In this case, you have only to fix the
extremity to a lath, to be screwed down on
ridge, and have a few holdfasts to allow
roller to rest on at the eaves when the bl
is down. The whole thing can be put u
taken down at the shortest notice. W
these blinds, samples of which are now be
us, are made of rolls of wood of diffe
descriptions or thicknesses, and bound
gether by an interweaving cord, painte
nice tone of green, and are really orname
as well as useful. That they will answer
purposes intended by the patentees, we h
not the slightest doubt, and if they can
produced at anything like a cheap rate, t
are sure to be the first and best thing
ployed about all gardens where shading
necessary.

AYRES'S IMPERISHABLE HOTHOUSES.

WE publish, in the meantime, without comment, Mr Ayres's views on the Imperishable Hothouse, which he has protected by patent, illustrated by a few of such as seem to take the eye, and such as may meet the wants of many of our readers. When we have had opportunity of seeing them erected, and in working order, we shall be better able to speak upon their merits.

Mr Ayres, in his pamphlet, after alluding to the origin of these houses, claims for them the following advantages:—1. Their imperishability; 2. Their superior warmth and lightness; 3. Their perfect portability; 4. The reduction of material and subsequent after-painting to the smallest possible quantity; 5. To the fact that skilled labour can be entirely dispensed with in the erection of these hothouses.

IMPERISHABILITY AND LIGHTNESS.

These houses are constructed of cast and wrought iron in combination, glazed with glass of superior strength and quality, while the side walls are formed of a concret
clean washed pea gravel and coarse r
sand, bound together by the best Portl
cement, and strengthened, where necess
by the introduction of T iron, or of t
cotta. Hence, the framework of the h
is formed entirely of iron, so light, yet str
that each house may be said to combine
necessary maximum of strength by the fe
tous combination of the minimum of mate
the actual shade in the span roof of a h
30 feet long by 12 feet wide, being only
feet, or 8½ yards super, representing a v
for painting of less than five shillings.
deed, the space in these houses which requ
painting is so small (see fig. 1), that cro
will do the work where pounds would b
quired under the ordinary system of build
Iron periodically painted may practicall
said to be indestructible. Then these ho
are as light as day, and may be describe
be a continuous sheet of glass, supporte
strong but light rafters of T iron, 6
apart, and with purlins to receive the

e squares of glass, 30 to 40 inches each other.

IGHT AND HEAT—THEIR INFLUENCE.

iese are the life of the inhabitants of lant houses, and just in proportion as are present or absent so is the vigour of lants cultivated. Plants, we know, are rted from all parts of the world, from ath the perpendicular rays of the sun in ropics, and from more northern climes, e the season of growth may be intensely int, and the winter a mantle of snow feet thick. Still, under such opposite ions, light is the source of life, and for ison as essential in one climate as in her. At the same time it should be ected by the cultivator, that the mere edge of the native country is not al- a correct index of the amount of light a certain plant may require for its per- evelopment: for its natural habitat may ie face of the unshaded rock or the ite extreme of the thickest part of the : and hence to expose the two plants same amount of light in this country be the height of folly, and is the error which many cultivators wreck their claims to success. At the same time, in this dull climate, it is essential that in constructing a plant house the light admitted should be as little intercepted as possible; for though for a few months in the height of the growing season we have more light than we may consider beneficial, and hence use shading, yet, for the remaining portion of the year, light is frequently painfully deficient and the plants suffer accordingly. The Imperishable Hothouse has comparatively no shade, and consequently the flood of light is much greater than in any other houses that have ever been designed.

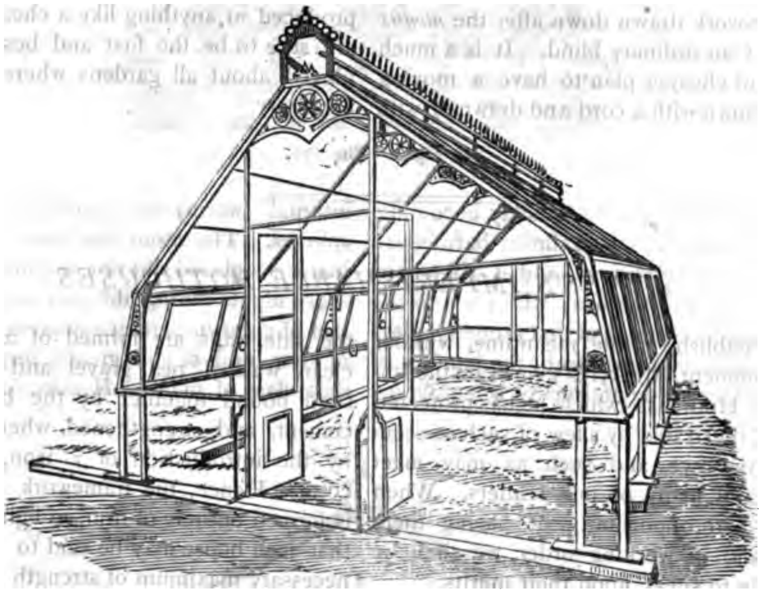

Fig. 1.—Skeleton of House, shewing its Lightness.

Nor is the gain of light the only advantage derived from this system of building. The great fault and failing of iron houses, as ordinarily constructed, is, that metal is a rapid conductor of heat, and consequently when the atmosphere of a forcing house is heated to say 70 deg., while that of the external atmosphere is below freezing, or possibly below zero, the loss of heat is so great as to materially interfere with the consumption of fuel and the cost of maintenance. Hence, covering for houses is sometimes used, and double glazing has been recommended, and practised by some, while others have tried to render the iron non-conducting by fixing the glass under slips of felt instead of putty, and though this may be said to be the better plan, it can only be pronounced to be partially successful.

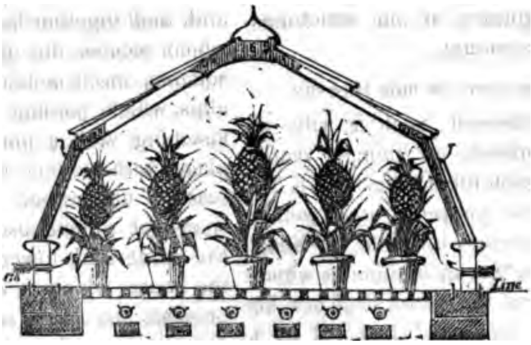

Fig. 2.—Pine Pot.

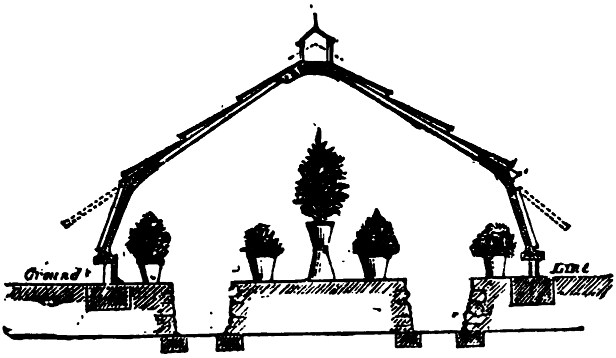

Fig. 3.—Greenhouse.

Iron is unquestionably one of the most rapid conductors of heat, a bar 1 foot long placed 1 inch in the fire quickly becoming "too hot to hold." Place a similar bar of glass under the same conditions, and it will fuse at the fire end before the heat will pass to the other. Taking advantage of that property, glass is used as an insulator of heat; the handles of our familiar tea kettle and many scientific instruments being insulated by the use of glass. Those who have practically investigated the matter know that a house glazed with thick, say Hartley's rough plate, instead of ordinary 15-ounce glass, will resist 7 to 10 deg. of frost without injury, while the other would be frozen; and hence, to use strong glass may be considered strictly economical.

Reflecting on this, it was determined that the Imperishable Hothouse should externally, as far as possible, be a continuous sheet of glass—first, to protect the more perishable metal, but more to act as an insulator of the internal (warm) and external (cold) atmospheres. The result has been that a greenhouse so glazed did not require a fire half a score nights during the past severe winter, a fact of great importance in an economic point of view, and of still greater importance with that class of plants—Heaths, for example—which will sustain less injury from 4 or 5 deg. of frost, than from an excess of heat to the same amount. The young man, a very talented plant grower, who had the charge of the house first called our attention to the fact; and subsequent experiments have ned its correctness; so much so, that lieve we are warranted in saying a-third el will be required for a house glazed this plan than for one glazed upon any principle. This may appear to be a assertion, but at the same time we e it to be a strictly correct one. Hence, nk we are fully entitled to take credit e superior lightness of our structures, lso for strict economy.

RFECT PORTABILITY OF THE HOUSES.

ere this is desired, as it is with all iolders, incumbents of livings, yearly ts, or even freeholders, who have a life st only in the property upon which nay find it necessary to build, it is im- nt to be able to put up hothouses which e legal sense of the word shall not be ched to the freehold," but will be a int's fixture," and which at any time can moved without a square of glass being n, or a screw of the fabric injured. l to blocks of stone or concrete (see 2), the iron standards have a re- or chasing into which the concrete rra cotta slabs, which form the walls e houses, fit with perfect ease, and e removed at any time, and conse- tly no brickwork or masonry is required, the slabs are scarcely less perishable the iron itself; and they have the further ntage that, unlike sheet iron, or perish- wood, they require no painting. The es or stages for the plants to stand upon formed of the same material, and they anelled to hold water, in or over which lants may stand; and they are perfo- , so that by the use of the chambered pot — also protected by this patent—a m of warm air may be sent constantly igh the chamber which the soil in the pot unds. This is found to be a perfect m of obtaining the necessary earth heat ut the nuisance of plunging material, in h it is impossible to tell whether a plant res water or not.

E REDUCTION OF MATERIAL AND COST OF MAINTENANCE.

e Imperishable Hothouses are formed skeleton of iron work, the several parts of which may be described as a standard or mounting, the spandril or head piece, and the rafters of T iron, which connect the the two together, and form a span, each of which when properly adjusted will carry a weight of 5 to 10 cwt., without yielding: a sufficient guarantee of strength. These, which may be called the principals, are connected and tied together by light recessed purlins, which receive the glass by the ends of the squares, and it is held in its place by metallic clips, which, passing through the purlins and fastening with a pin, hold the glass in its place with perfect tightness. This will be readily understood on reference to the span-roof greenhouse, fig. 3. These, with the front and lower ventilators, constitute the house, which, it will be readily perceived, presents but a very small surface upon which it is necessary for the painter to exercise his avocation. At the same time the houses admit of a large amount of ornamentation, indeed, they may be built in any form and of any size, without the principles involved being violated.

SKILLED LABOUR NOT REQUIRED.

The parts of these houses, being all cast from the same mould, fit perfectly into their allotted places, and hence, upon receiving a house, any intelligent country artizan or labourer may put it together and finish it completely. The house received, the first thing will be to fix the blocks of stones, into which the standards are to be dowelled in their places with accuracy. Then, having fixed the standards, fit spandril and rafters of T iron together (see fig. 4 for a better illustration of this); raise the principal thus formed by means of a pulley and derrick to its place, and fasten the pins into the stones by filling the holes with Portland cement; and proceed in the same manner until all the principals are in their places. The next job will be to fix the facia, louvre sash, purlins, and water spouting, and, that done, the house is ready to receive the glass. Before, however, that is put on, give the final coat of paint to the framework; and. the glass fixed, the work will be complete. In this manner it is found that a handy man and labourers will fix and finish a span-roofed house, 30 feet long by 18 feet broad completely, the finishing coat of paint included, in two or three days.

After this statement it is scarcely necessary to remark that the glass may be taken out and restored, or breakages repaired, with the greatest facility; indeed, with a few sheets of each size of glass in stock, the gardener may be said to be independent of the glazier from the moment the house is completed. This is an immense advantage to persons in country districts, who have frequently to pay more for a man to go several miles to put in a few squares than for the glass itself.

IRON AND GLASS—THEIR EXPANSIBILITY.

The greatest objection hitherto urged against all iron hothouses, besides their coldness, has been the expansibility of the material—its tendency to expand in warm weather, thus fixing the sashes and doors, and frequently breaking the glass; and, on the contrary, to shrink in cold weather, and if the putty be good, crack the glass in that way. Now, on the present system of glazing, the glass has free expansion room on all sides, so that not a single square can be broken in that manner. "But," exclaims some sceptic, "the rain will drift in, and the glass will be blown away." The suspicion is perfectly reasonable, but facts are dead against it. Twelve months' experience with a rude structure and inferior glass, the openings in many cases being sufficiently large to allow a straw to pass through, demonstrates the fact that the rain will not drift through—at least not so long as the edges of the glass are clean,* and there is nothing to intercept the free flow of the water; but place a blade of grass in the line of fall and the water being stopped will directly run in. The difference in the temperature of the atmosphere and the consequent buoyancy of the internal air, is believed to be the reason why water does not drift or run through the laps of unputtied glass. Whatever may be the cause, the fact is indisputable, and removes one of the greatest pests of modern gardening—a leaky plant or forcing house.

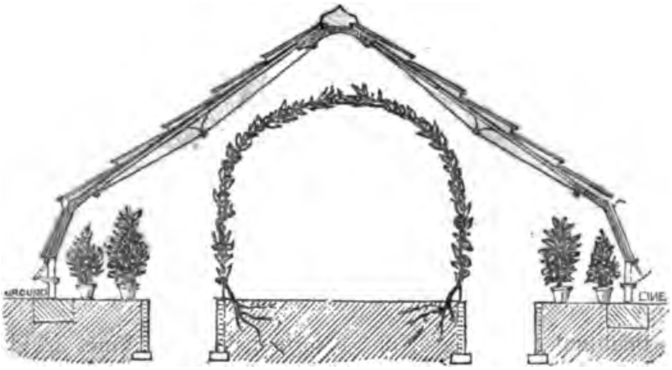

Fig. 4.—Greenhouse or Orchard House.

In this system, however, if it be desired to make assurance doubly sure, and form a roof almost air-tight as well as water-tight, that can be done by making the joints with a cement which we prepare for the purpose. Speaking practically, however, we consider such a course quite unnecessary, and for the purposes of cultivation would rather have the "chink 'of air" here and there in the glass work of the house, than a roof hermetically sealed. Advanced gardening is undergoing a material change in this respect; many gardeners having as much dread of a current of air passing among their plants, as some over-solicitous mammas have of "the breeze which ruffles the Roses" breathing upon their pets, forgetting that thousands of the children of misfortune and neglect, who are as innocent of the luxuries of life as they are ip and water, sleep under the broad y of heaven with the wind for a mantle, o far as health is concerned, they ite in it.

ch the same is it with plants; more are d to death than killed by neglect; and nt ventilation is perhaps a greater of inferior productions in our hot- than any other cause whatever. Did permit, it would be easy to give ex- of this proposition; but we give it as which the best practical cultivators in intry are bound to endorse. Hence, ot a word about chinks in the roofing, it be to express approval at their here.

ig. 5, which is a correct representa- the house exhibited at the meeting Royal Horticultural Society at Not- , one peculiarity of structure must be Except the ends, it has no perpen- glass, the fronts or sides which other rs place perpendicularly, being in our on the slope. The reason for this is no light passes through perpen- glass, and when we say no light, we word in a comparative sense. To he full power of the sun's rays, the ist stand at a right angle with it, but pendicular glass almost every ray is l, and for positive life-invigorating s rendered almost useless. Through ing sides some direct light may be l, and that at a most important iz., in the dark months of winter. e observed that this house is ventilated first through the side panels, carrying the cold air in contact with the heating and evaporating troughs; secondly, through the side lights, which open simultaneously; and thirdly, by opening sashes in the louvre box. This house is designed either for the cultivation of stove or greenhouse plants, the heating power introduced constituting the difference between them.

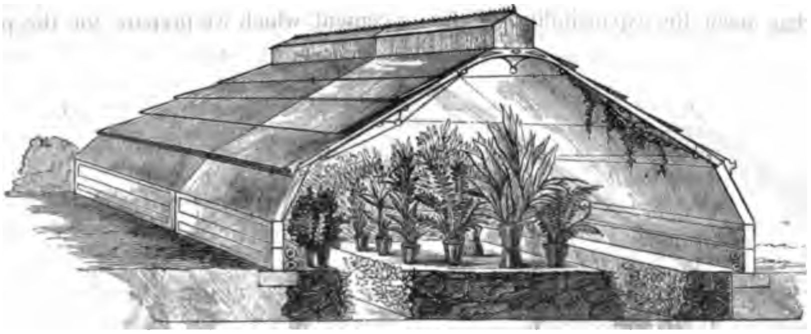

Fig. 5. —Specimen Conservatory.

FORCING HOUSES.

The early vinery (fig. 6) does not differ materially as to form from other vineries, except that the pitch of the roof is cut short near the top of the rafter, or rather at the commencement of the head piece, an arrangement which gives increased space for management where Vines generally make the most luxuriant growth. Vines are shewn upon the back wall, but we merely look upon these as a source of supply until the permanent Vines are established. As we have remarked many times before, the most prolific source of failure is heavy and premature cropping. For that reason we say, plant duplicates, so that the permanent Vines may not be cropped until the third or fourth season after planting.

The orchard house (fig. 7).—Here, too, we have ventured to break away from ordinary practice, so as to take our house to the plants, rather than the plants to it. This house has a sunk path, and is suitable for forcing of any kind, from pet Vines and Peach culture to Cucumber and Melon growing. We may be asked why we depart from the general practice? And we say because in all our travels we have never seen fruit anything like so good upon an orchard house tree as that which is ordinarily grown upon the trellis. No person, so far as we have seen, grows Peaches in quantity and quality half so well as our neighbour Mr J. R. Pearson, of Chilwell; but still, compared with the produce of that grand old Royal George tree at Chatsworth, which for the last twenty years (with two or three exceptions) has produced ten to twelve hundred fruits annually, it, both in size and quality, sinks comparatively into insignificance.

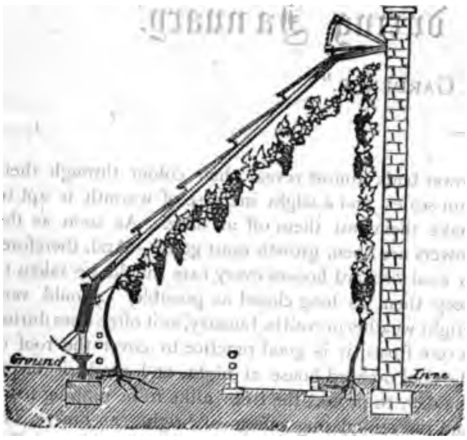

Fig. 6.—Early Vinery.

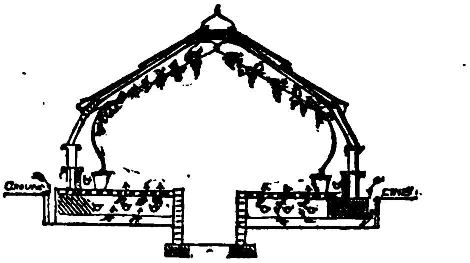

Fig. 7.—Orchard with Sunk Path.

We do not say this out of any captious spirit, but from a firm and matured conviction. Orchard houses have now become a regular garden institution, and as, from the fickleness of our climate, the demand for them appears likely to increase, it is desirable that we should leave the region of toy, and take our stand upon the ground of solid cultivation. Pot fruit trees are all very well; indeed, they are admirable, as managed by some cultivators, but, taken upon the average, they are by no means a remunerative, not to say a profitable investment. Hence we say for a permanent supply, adopt open border planting, and you may do so with the conviction that they will serve you when the daily trouble of pots has ceased to charm. For this reason we recommend a central trellis, which, being from base to base 23 feet in girth, offers a training surface nearly equal to two 12-feet walls. It may be argued, that upon the permanent planting plan we cannot have so great a variety of fruit, but that is a mistake, for nothing is so easy to bud as a Peach, Apricot, or Plum, so that, if so desired, every main branch (or even branchlet) may be a different variety of fruit. Amateur pomologists may seek a great variety of fruit; gardeners, whose reputation centres in an abundant supply of good fruit at all seasons, confine themselves to proved kinds of superior excellence and sure-bearing properties.

Nothing we know is so inimical to the maturation of fruit, especally of stone fruit, as shade and insufficient ventilation; nothing is so inducive of its perfect development and maturation as the fullest possible exposure to light and air; and for that purpose the trellis offers advantages which no other system can compare with, and our system of glazing, the means of removing in a few minutes the glass from any tree, or all the trees, and thus expose the ripening fruit to the full action of both light and air. In addition to this, the space under the trellis would offer a splendid storage for winter salading, Cauliflower, and other vegetables; while, as spring advances, the same space might be filled with choice Pears, Apples, and Plums, in pots, which would be protected until the fruit was set; and then, as they required more light, they might be removed to the open air to complete the growth of the fruit. Thus a trellised orchard house would produce more and better fruit than one of the same size upon the ordinary plan.

Work in the Garden during January.

From "THE VILLA GARDENER."

THE VINERY.

E dawn of a new year arouses the energies of all rue gardeners. They feel as if they must be do. nething. The time for inaction, if, indeed, there : such a time in horticulture, has passed away. ew Year comes, a symbol of life, and there is a unger that our impatience will force it forth too

The weather, often at this season, fits in with patience. The air may be genial, the sun peep and the world look as if winter was past. The orn year is cradled in green. All this is exhila- and deceptive likewise. But in gardening we not trust appearances. Cold nights and bleak s days are hidden behind all this summer-like ss.

the Vines stand still. To ensure their doing so, s much air as possible when the weather is und keep the house, and more particularly the of Vines, dry. Moisture has a most animating ce on plants ready to start into growth. It ; the scales of the buds, relaxes the bark, and vital force to start into growth. And when nial sun sends its light and its heat to aid mois- n its entreaties to the buds to come forth and the chances are that the two will prove irresist- nd that the buds will start. To prevent this, he Vines cool and dry. Beware, however, of to the opposite extreme. There are degrees of s. It is impossible, indeed, at present, in our e, and without the aid of powerful fire heat, to he stems of Vines too dry. It is far otherwise, er, with the roots. These should be kept tely moist in winter, and, indeed, at all sea- for they never cease growing, and the doings Vines next summer are probably very largely lent upon the state and doings of the roots this

Then as to cold. The Vines need not be d to actual frost: from 32 to 40 deg. is a nge to ensure perfect dormancy and complete A temperature beyond 40 deg. would excite the too much, unless it is desired to start them in y. We would not recommend this unless the rdener has more houses than one.

THE ORCHARD HOUSE.

and quiet must be the order of the day here January. Peach, Nectarine, and Apricot trees re easily excited than Grape Vines. The plump flower buds almost reveal their colour through their thin scales, and a slight increase of warmth is apt to make them cast them off at once. As soon as the flowers are open, growth must go on. And, therefore, in cool orchard houses every care should be taken to keep them as long closed as possible. Should very bright weather prevail in January, as it often does during severe frosts, it is good practice to cover the roof of the cool orchard house at night, and shade it during the day, to protect the trees alike from nipping frosts and the stimulating effects of bright sunshine. The one thing needful is to keep the trees dormant. See also that they are clean. Those clustering scales and greedy aphides are apt to come from no one knows whither, and make a fresh dash at the sweet buds and tender wood. Give them another dose of Gishurst's Compound should they re-appear.

The roots may also have a good soaking of water, if they seem dry. Dryness at the root is often carried to great excess in orchard houses, and is a frequent cause of bud-dropping, and possibly of fruit-dropping likewise at a more advanced stage. The two extremes of wet and dry are to be equally avoided. It is the height of folly to drench roots with an excess of water when there is no growth of top to utilize it. But it does not follow that the earth is to be kept so dry that the growing roots cannot find sufficient moisture to dilute their food into that state of tenuity as to give it free course to the heads of the plant.

THE GLASS HOUSE.

Slow and sure, should be the two rules here. The temptation is strong to adopt quite a different course. The scarcity and value of flowers at this early season sorely tempts one to force growth. But it must not be done to any great extent at least. It means weakness. The sun has not sufficient power as yet to strengthen these early growths, and therefore they must not be made. Maintain a temperature of from 40 to 45 deg. at night, with a rise of 50 deg. by sun heat during the day. Secure a change of air by opening the top of a light or lights, or, better still, a ventilator on the roof. But beware of through draughts. They steal the moisture out of tender plants as we would wring water out of a sponge, and in doing so, they chill them through likewise. On very mild days, lower openings may be used for the admission of fresh air near to the plants. But then the upper openings must be closed, and the rule of

ir for the winter months should be never to
and bottom air spaces simultaneously.
r in the morning, and with care, and only
he plant watered is dry. Indiscriminate
r watering is death to thousands of plants.
re two plants side by side, one, say a fast-
, early-flowering Heath, as dry as rapid growth
orous health can make it ; the other an over-
Camellia, bearing a good crop of growing
They are watered copiously day after day,
eiving the same quantity. The Heath goes
thrives admirably, but the Camellia, "Oh
n be the matter? The buds don't grow, and
y two of the largest dropped off, and to-day
; and the others all look ready to fall, and
aid to touch the plant for fear the buds should
e off." There can be no flowers on this
a this year. They have been washed off, as it
om within. The roots, the stems, the leaves,
ls have been filled to repletion with water.
ble light and the leathery texture of the leaves
l it impossible for them to get rid of it, and
er buds have fallen victims to dropsy. Ex-
he soil, and you will find it watered into mud:
ts, and you will find them water-logged into
ttenness. Each plant requires its own specific
of water. No two tribes of plants can drink
ntage the same allowance. And the same
eed very different quantities at different stages.
as, for instance, are great topers at one
ut that is not the flowering one. After their
blossoms are all over and gone, and they
make wood, they are greedy of water, as wil-
the water brink ; and it is the same, more or
th all other plants. As a general rule, much
er is needed in winter than in summer. The
less power, though the air is drier. The
es—and those most simple and common-sense
—are, never water a plant till it is dry, and
nough to quench the thirst of every root when
tered, and no more until it is dry again. It is
portant not to wet the foliage in winter water-
d with such plants as Chinese Primroses allow
enter the heart of the plants, else you will
ve none left to water. Place Pelargoniums,
es, Camellias, Hyacinths, Crocuses, Snow-
&c., in the warmest parts of the house, if there
difference ; and Heaths, Epacris, Cytisuses,
, Azaleas, &c., in the colder and more exposed
s. Callas, or the Lily of the Nile, make a
ow at this season if started early in October.
ly often makes its appearance early in the year.
it at once with tobacco smoke. It must have
rter, and it makes more havoc on tender
in a day now, than it would a week later in
son, when wood and leaves become more
. Pick off every dead leaf, or better still,
so skilfully that none shall die, and see that
ood-work, flower-pots, everything in and about
se, are scrupulously clean. If cleanliness looked out of all our glass houses with smiling face to welcome the new-born year, rich harvests of beauty and plenty would be gathered out of most of them, while the pleasure of the growers and the gatherers would be immensely enhanced.

PITS AND FRAMES.

Hot Pits and Frames.—Keep up the temperature from 55 deg. to 65 deg. This is done by adding fresh manure to the linings outside, or renewing the bed, as it is called, inside. In the former case, long dung may be used ; in the latter, the material must be sweetened, as it is called, first. That is, fresh dung from the stable, mixed with one-half or one-third of tree leaves, if they can be had, should be thrown up in a ridge of any convenient size not exceeding 2 yards at the bottom, and from 1 to 2 yards high, and allowed to heat for several days. Then turn it inside out, and allow it to heat again for four days, or a week. If the rank steam has gone off in that period, and it smells what some gardeners call sweet, it may be put in the pits or frames, to form a hot bed; if not, it must be ridged up again and worked, that is, frequently turned over until it does. Then place it in the frame or pit from 4 to 6 feet deep. The effects of these preparations are, that the manure will keep its heat longer, and no ammonia or carbonic acid of sufficient strength to injure vegetation will arise from such fermenting material. If the dung were used fresh, the steam freighted with such gases would destroy every green thing as effectually as if hot brine had been poured over them. Asparagus, Seakale, and Rhubarb, may be forced in such pits, and Bulbs, Roses, &c., brought forward to enliven the rooms or conservatory. In fact, the advantages of heat in winter are manifold, and can easily be had, as cotton-waste, tan, coco-fibre refuse, leaves, sawdust, &c., will afford heat as well as dung. Whatever amount of heat may be provided inside such structures, it is well also to apply linings of hot materials outside. These "linings" dry the walls, and throw in surface heat.

Cold Pits, &c.—Exclude frost merely. This is generally done by covering with mats, reeds, straw, &c. Give abundance of air every fine day. Water the plants in the morning, and in doing so, be careful not to wet the leaves or crowns of the plants. This caution in watering is especially needful for Carnations, Pinks, Auriculas, &c. These perish wholesale in winter by water in the heart. If any gets there, from drips from the lights, or by other means, the plants should be inverted to get rid of it, and their position changed. Nothing is more ruinous to such plants than drip on leaf or crown. The glass on cold pits and frames should be whole and clean, and thus little or no drip will be possible.

THE FRUIT GARDEN.

Pruning, training, tying, or nailing, should be pushed forward in mild weather. The sooner all such milar works among hardy fruits are finished the

rs, Peaches, and Apricots, are safer deferred in
localities. The sooner these are pruned the
r they flower; and early flowering is certain de-
on of the crops. The flowers come forth in
th and beauty, and one night's frost converts
into blackened masses of dead tissue. It is a
ale to such a hopeful prospect. The most sure
rtain means of protecting fruit-tree blossoms is
rovided by Nature—the bud cases. It is as-
ing how much cold they keep out. Practically
are frost-proof up to 20 or 30 deg. of frost.
s soon as the flower buds leave their shells, they
great danger. They somewhat resemble very
spring chickens. Set these in the teeth of a
wind without the shelter of a mother wing, and
perish. It is even so with buds newly out.
pruning keeps them in as long as possible, hence
portance.

ne plants, however, such as Grape Vines, bleed
ofusely when pruned late, that these means of
ing them cannot be safely adopted.

n Air Vines should be pruned at once. Those
d on the south gable ends of villas or cottages
be considerably retarded by shading. A thin
hing of green spruce boughs is the best material.
e sun strengthens, the leaves or needles, as the
of Conifers are sometimes called, gradually fall
few at a time, until early in May the whole may
noved.

ep a sharp look out after the birds on Gooseberry
s and on walls. Destroy them, scare them away,
nder the buds so unpalatable by sprinklings of
that they cannot eat them. We have known the
make a clean sweep of the season's dessert (the
in villa gardens, hence my constant reference to
Last year we had a glowing espalier of Apple
m, which has hitherto escaped untouched,
d in three days. It is awfully provoking. Fore-
d—forearmed.

ring frosty weather, wheel manure on to Straw-
, Gooseberry, Currant, or Raspberry quarters.
ese when in full bearing, like abundance of rich
and gain much in size and quality by an annual
ng. In well drained gardens two or three
ugh soakings of sewage during the winter proves
cellent stimulant for such plants, and, likewise,
pples and Pears, and, indeed, all fruit trees that
signs of weakness through excessive cropping.
liquid dressings must not, however, be applied
sty weather, nor allowed to freeze on the surface.
st immediately succeeds the sewage beverage
ou have given, mulch the surface with litter to
it out.

uit Stores.—Examine once or twice a-week.
v no one fruit to rot, else it will affect many, not
with rottenness, but also with loss of quality.
reserve fruit in its highest excellence, decomposi-
nust not be permitted to vitiate the atmosphere in which they are kept. It saves much trouble in the keeping of fruit sound, if, at gathering, all cracked and inferior fruit are separated from the perfect. It is the former which always give way first, and they taint the others. The cracks in Pears seem designed to let the air into the tissues, and rottenness quickly follows. Apples generally keep remarkably well at this season of the year.

THE FLOWER GARDEN.

Keep a sharp eye on bulbs in beds or borders. Mice and rats view these as their winter perquisites, and many a sweet meal they make of our spring beauties. Our mice have adopted a new mode of attacking the Crocuses of late years. Finding that we were always after them, they have taken to mining, making an entrance in some obscure corner, or under a shrub; they undermine the Crocuses, feast away at their leisure, and make no sign. We test for them now with a pointed stick, which suddenly gives way when it probes a run, and then the miners have to be treated as warily as moles. Or sometimes the runs are flooded, when poor mouse, like the witches of olden times, has but a cruel choice of two deaths, drowning, or—well, a knock on the head.

Choice Ranunculuses, Tulips, &c., will need some protection from very severe frosts. And the ground between or over Hyacinths, Crocuses, Narcisuses, &c., should be loosened with hoe or rake, after heavy rains, &c.

Spring flowering plants, such as Forget-me-nots, Arabises, Daisies, Pansies, Polyanthuses, Primroses, are grateful, and grow all the healthier and stronger for surface scarifying.

All herbaceous border or flower beds, &c., ought to have been pointed or dug deeply, and as roughly as possible, months ago. But if not done, better late than never, and lose not a moment in doing it now, if weather permits.

Most evergreen shrubs do as well, or better, planted in April, as any other month. This leaves the month free for making the necessary preparations for new plantations.

Deep trenching, thorough cleaning, and moderate enrichment of the soil, are the chief points. Of course, always assuming that it is moderately dry, or made so by drainage. Nothing pays better for a thorough preparation than shrubs. On well-made, suitable soils they will make more progress in one year than in six. Nor is this all, they will put on a freshness and a beauty totally unknown to the same varieties under unfavourable conditions.

All changes of ground, or such work as the laying of turf, &c., should be completed as soon as possible. Also the pruning of deciduous ornamental trees and shrubs.

Roses.—Mulch with rich manure, and see that the heads of tender Roses are properly protected. Re-label and re-stake where necessary.

Remove scions of choice varieties for grafting.

Summer Roses, and the hardier sorts of perpetuals, wanted to flower early, and climbing Roses, may be pruned.

Sweep and roll the turf and walks weekly, and see that none of the old year's litter mars the face or blights the hopes of the new. As there can be but few flowers, let us see that cleanliness and hope are waiting to welcome the golden Aconite and fair Snowdrop, with its silvery bells that ring in the new-born year amid the iron fetters of frost.

THE KITCHEN GARDEN.

Cropping.—See to Peas and Beans sown in November. If growing either above or below ground, all is well. But if the mice and rats have eaten them, or the cold and wet have caused them to rot, sow again of the same early varieties. If severe weather continues, sprinkle a few Asparagus stems, a little dry fern or straw over Brocoli to save their crowns intact. A very little litter sufficeth to make the hardier kinds frost-proof; and this vegetable is so indispensable in spring and early summer, that no labour nor expense should be spared to carry it safely through the winter. In mild winters, Walcheren, White Sprouting and White Cape Brocoli will often be coming in now. They should be looked over daily, and all that shew be carefully gathered and stored. Where several come in at one time, it is a good plan to pull up the entire plants, and place them in cold frames, or in a cellar, shed, or outhouse.

Endive may be served in the same way, and Lettuces also.

Advancing crops under handlights or Rendle's Protectors, move the surface soil among, and protect from severe frosts by coverings of long dung or any kind of litter.

Sow *Radishes and Early Horn Carrots* under protectors, in a warm place, to succeed winter crops.

Parsley.—Cover part of a row with a protector, and gather fresh and green, for garnishing in consequence. Place roots of Asparagus, Seakale, Rhubarb, in heat for early cuttings, or place large pots or boxes over them in the open air, and force an early growth with hot leaves, tan, and manure, or a mixture of all three.

Protect the crowns of *Celery*, *Globe Artichokes*, *&c.*, and take up a week's supply of the former, and store it in earth, in a frost-proof, readily accessible place.

Dig or trench all vacant ground. Every day that it lies unmoved, it loses much of the natural riches, manurial or mechanical, distributed every hour without money or price from the inexhaustible resources of the atmosphere.

Composts and Manures.—Now is the time to use up all that were made last year. Get these on to the land in dry or frosty weather, and dig or trench them in at once. Also lay the foundation of next year's manure store. Every leaf, dead herbaceous stem, weed, blade of grass, piece of turf, road scrapings, all ashes, soot, straw, hay, moss, droppings, sewage—in a word, all waste, dirt, everything that has ever had life, and a good deal that has not, form manure. The more variety the richer it mostly is, and the more likelihood that every plant may find something it likes. Let all these matters be put together, and be mellowed by time and enriched by slops, and such a stock of stimulating matter will be always at hand as will astonish the villa gardener, alike by its quantity and potency.

Finally, let scrupulous cleanliness, and orderly neatness reign supreme, alike amid the bare boughs of winter as you would with the luscious fruits and tender crisp vegetables of summer.

The Stable.

THE SHOEING OF HORSES.

article which appears in the *Toronto lobe* on the "Care of Horses' Feet in ;," Mr Robert Labiston, Caledonia, a l farrier, says:—I have often seen ome to be shod whose feet had never aned or washed since it was done by er. In such cases the shoe acts as a hold on the dirt, which, when not out, rots the frog, and gives rise to &c. In this way, it makes certain the ion of the foot; for the one grand our shoeing is, it throws the horse natural footing without supplying a ivalent.

ng down the feet nicely, as they call ite a passion with some people. I en rasped the hoof, and the owner of e standing by to tell when it would n. This rasping on a hoof that to be a little ill-shaped, until it will nder your finger, is far too dangerous r making things look well. I have mmenced on hoofs that had a beauti- all over, and given them a thorough not that I could make them any or that was beyond the power of hands, but they had to be rasped ecause the owner's mind was a slave n or fancy. This rasping takes the rface off the hoof; and Nature, l she can to make up for the evil injudicious hands, forms a hard rface to protect the foot. This rface takes the place of the previous rn, and at the next shoeing the hoof ably split a little at the nails, and quently the nail punches a piece out

' feet, when not properly taken care of in the stable, will sometimes gather a kind of soft, raggy substance round the coronet. This, if not removed, will spread, and destroy the tough fibres of the horn; just as that sort of mossy scurf, which sometimes gathers on the bark of fruit trees, if allowed to remain, will destroy the bark, and ultimately kill the tree. But if the horse is properly attended in the stable, nothing of this kind will be seen. Even when it does appear, it should be carefully removed.

Greasing the hoofs, above all other things in the management of horses, is the most deceiving. One would imagine that it should soften the horn; but the very opposite is the result. I had often noticed that it was very difficult to keep shoes fast on feet that were greased. The grease appears to shrink the hoof, and destroy the elasticity of the horn. I afterwards had an excellent opportunity of observing the effect of greasing the feet whilst working in a shop where horses were shod for a large undertaker's establishment. The treatment of the horses by the horse-shoer was the same as that of hundreds of other horses shod at the same shop; but the feet of the funeral horses were greased every time they went out, to make them nice and black; and as the fruits of this practice, the hoofs almost ceased growing. They were exceedingly dry and brittle. The sole was not hard and glassy, as feet are after paring, but of a dry nature, and could in many cases be easily crumbled down by the fingers.

This kind of polishing is all very well on a hoof for a snuff-box, an inkstand, or some other useful ornament, after the ravens have picked the horse's bones; but on horses that are meant to work, never allow it to begin.

EFFECTS OF DISEASE ON ANIMAL TEMPERATURE.

ONE of the most important branches of study in connexion with disease in the human being, or among the lower animals, is that of morbid temperature, or those variations of animal heat which result from disorder and disease. This department of inquiry has been heard of most in connexion with disease in mankind, the latest test of its value and importance having been demonstrated in the severe illness of Britain's future king. It must not, however, be inferred that as far as the lower animals are concerned, their ailments have furnished little opportunity for testing the value of the study in reference to the progress of morbid action. On the contrary, some of the most extensive and searching investigations have been made, and scientific efforts now take bolder strides, while opinions, in many cases, no longer partake of uncertainty and doubt, and the course of disease may be defined—nay, even its very approach is foretold—with unerring precision.

This will, doubtless, at first sight, appear paradoxical, but attention to a few facts will clear aside the mystery. The circulation of blood within the system is intended for manifold purposes. The following are sufficient for our purpose, viz. :—First, for conveying nutrition to all parts of the body, providing for its growth and maintenance; second, for equalizing the temperature of the body, as resulting from vital and chemical processes conducted within the blood itself; and third, for conveying to appropriate organs such parts of the body as are no longer useful, for the purpose of expulsion from the body.

Among the organs used for the latter purpose are the skin, kidneys, liver, intestines, &c., and when these act in health and vigour, they serve the office of so many purifiers of the blood, by removing its baser portions, which, if retained, would act as poisons. Good food and a proper circulation are also essential agents in maintaining a proper state of animal heat, a therefore, health also; and any interferen with the quality and offices of these gi rise to an abnormal condition known disorder, or disease it may be eventual and in proportion to the amount or intens of the interruption to those vital process animal heat suffers a morbid increase decline, by understanding which the pr titioner gains important evidences, frequen long before outward signs exhibit any in cations of change within.

It is also interesting to notice that various functional derangements occur a different types of disease are engendered, temperature of the body assumes an elevat above or decline below the natural st dard, that practitioners are enabled to scribe a specific temperature to each, and this way much of the difficulty in diagn is rapidly done away with. There is now doubt upon this question, and from the tainty with which the conclusions may drawn, much assistance is given to the po and safety of the practice of medicine.

Take, for instance, an animal in the ear stages of an active disease, as pleurisy pleuro-pneumonia after the sporadic t All the usual outward signs are not thorou developed, but the thermometer place the rectum, at once indicates an unu temperature—probably 104 deg. Fah. or deg. Fah. And this elevation is persi throughout the acute stages, with only s exceptions, arising from certain functi processes. Towards evening, also, the perature rises, probably, 1 deg. or more, before morning, declines to the prev reading, and this goes on day by day, the activity of all functions, by reas disease, is no longer hastened, when re tion commences, and a gradual daily de is exhibited until the temperature regai normal standard. Similar conditions n all diseases of an active or acute eumatism, peritonitis, enteritis, gas- the exception in each being only in of elevation, which the practitioner ly very closely in order to deduce onclusions therefrom. In severe so, as open joint, punctures of the ures, &c., the thermometer is an d delicate test of the progress of y. While the injury remains in its m, and the destruction is confined primarily involved, the readings are t, and foretel with marvellous promp- instant when recovery has begun, l and firm decline at each evening n, with a corresponding lower ch morning. But as soon as com- arise—when other organs become in the general disturbance and he thermometer also notifies the h wonderful accuracy, and in a few e all outward signs bear witness to on of the warning.

ladies characterized by an opposite phoid or congestive states—the ter is equally valuable, and nothing nore to enable the scientific veteri- eparate and define certain diseases ss and others of an opposite nature they were previously confounded.

e prevalence of enzootic disease e horses of the metropolis last was frequently said that a number ble, apparently suffering alike, were under the same form of influenza, a general examination this would rrect. Treatment would, therefore, r of course, be of a general cha- all; but progress would not be alike nd this difference alone would be ut unaccounted for. The ther- iscovers in one that the disease is rough a more acute form by shew- reased temperature; but in others— stive form—a low reading is given, is at once the key to the correct treatment. Without the instrument, ns are not sufficiently delicate to detect the state and progress, and hence, the treatment may be hindered or misapplied.

In contagious diseases of animals the thermometer is of immense value, as when those apparently healthy have been placed within the reach of infection are closely watched and tested by the thermometer, an elevation, persistent and characteristic of the malady is set up some time before the earliest of all other known signs are made known. In the epizootic form of pleuro-pneumonia, cattle plague, and foot-and-mouth disease, this takes place with wonderful accuracy, and thermometricy applied to this purpose alone and properly carried out, would prove an inestimable gain to the country, by enabling the stock owner to segregate or slaughter his animals before disease actually breaks out, and thus practically limit its spread over the kingdom.

As one out of many instances of the value of the thermometer in the approach of contagious disease, we may name one, in conclusion. A few weeks ago, a cow upon the farm was noticed to be suffering from garget, and in using the thermometer, an elevation of temperature—105 deg. Fah., —unusual to that disease, was indicated. Carefully weighing the matter in conjunction with the fact that foot-and-mouth disease was present in the neighbourhood, it was determined to watch this case. Another cow occupied an adjoining stall, and both were in calf. An increased elevation of temperature, 103 deg. Fah., was exhibited by the second cow, although not the least sign of ailment otherwise was visible. Throughout next day the high temperature continued unattended by any other signs, and we concluded infection had already commenced. On the following morning the cows were found to be salivating, and the disease became fully developed, both animals throwing their calves, and going through the several stages with the usual suffering and inconvenience. By this timely warning, proper precautions were instituted, and much loss and suffering among other animals, we believe, were avoided.—*Agricola.*

The Dairy and Poultry-Yard.

HOW PRIZE BUTTER AND CHEESE ARE MADE.

IN all things connected with milk, the Americans have shewn an example which the old country is glad to follow. Their cheese factories proved so successful that now we are making an attempt to introduce them throughout all dairy districts in this country. The success of the one which was established under the superintendence of the late lamented Mr Jackson, has been, we understand, so great, that it is in contemplation to erect others in the same form. American cheese made upon this principle has been largely supplying the home markets, the amount of money which we paid up to the end of October (chiefly from America) being, in round numbers, £3,000,000. In butter, also, the Americans are taking a step in advance of us. The following observations in a paper read at a meeting of the American Institute Farmers' Club by Messrs W. & H. Vandresses, of Shoharie County, who gained the first prize at the last New York State Fair, will, doubtless, be of interest to our readers:—

The milking is done in tin pails, and immediately strained in tin pans, containing about 6 quarts each; the pans are set on a rack made of slates about 8 inches apart. The temperature is kept from 55 to 60 deg. by our thick walls, by the flow of cold water, and by the use of ice. The milk is allowed to stand thirty-six hours before skimming. Great care is taken to cream the milk before it is thick or loppered through.

Our milk room is a basement under a wing of the house, the walls 7 feet high, the sides 2 feet above ground; the end or entrance of the room is 4 feet above the surface and 3 feet beneath; the opposite end joins the cellar under the main part of the house. The bottom is laid with cement, 3 inches thick; the walls are 3 feet thick, laid with sto
cement, and the surface inside plaster
cement, lathed and plastered overhead.
is a well of pure cold water in the
cistern on the outside, with lead pip
ducting the water into the room for
purposes. Under the pipe is a sink for
ing the milk. At one end of the coun
hopper or box for the skimmed milk,
is conveyed to the hog-pen through
logs under ground.

The churning is done by dash
driven by endless chain horse pow
churns running at the same time; 5
lb. are made at one churning, which
pies about thirty minutes. Great
taken not to churn too long, as it inju
grain. The butter is taken from th
with a ladle, and washed with col
water until it is entirely free from mil
hot weather, ice water is used; then
with Ashton salt, at the rate of 1 o
salt to 2 lb. of butter. It is then le
the next morning, when it is again
with a butter worker; care is taken
work too much, as it injures the grain.

It is packed in white oak pails,
52 or 53 lb. A cloth is put over the
the butter, and a thin layer of salt
cloth. It is then put in the store-room
it is kept until shipped.

Our milk-room is kept well ventilat
pure fresh air. It is impossible t
good butter in a close room; the anim
should be removed from the milk as
possible after straining. In summ
windows are open through the nig
morning. In cold weather, at mid-da
the temperature kept up with fire. W
three or four times a week, making a
age of 200 lb. a week, during ten mo

WINTER FEEDING OF POULTRY

cold weather comes on, fowls that have been running at large, find their ; of insect food partially cut off. ppers are minus, and the entomologi- k is being used up for winter. Now, ickens are not yet grown, and adult ot recovered from moulting, is the en a little animal food will pay, if Valuable chickens will grow much nd stronger by a moderate allowance, time of year, of sheep's lights and oiled and minced, or any similar resh meat bits.

ly all birds, when young, live principally nal food, though some change their maturity to herbs or seeds. There- rtly grown chickens, turkeys, duck- tc., that find their accustomed sup- insects stopped by the frost, must be lly provided for, or they will be more or less, according to their age, atest hatched suffering most. It is aid that the cold weather of late and early winter dwarfs fall-hatched s, and prevents their attaining full d in rearing bantams, whose value is rated in inverse ratio to their size, eggs are purposely set late. Undoubtedly the stunting is partially owing to the cold, but lack of insect forage is the chief hindrance.

We do not mean that animal food should be provided in such quantity as to form any considerable part of the nutriment consumed. But a little only seems to fill a very pressing need of the system. Just as in winter the feeding of a few beets or turnips will affect the thrift of cattle kept on hay to a degree out of proportion to the actual nutritious properties of the roots, as compared with the dry fodder, so chickens will be benefited by animal food. As for hens, they need it in the scarcity of insects, because exhausted by the process of moulting. Upon the successful weathering of the feathering crisis depends in a great measure the amount of laying in winter and spring. Nearly everybody who keeps fowls gives considerable attention to them in March, for then the cackling and stir in the poultry-yard, and the eggs yielded, are reminders of duty, but it is full as important to feed well in November and December.—*Albany Country Gentleman.*

The Country Gentlewoman.

THE PARLOUR GARDENER.

CHAPTER XI.

THE GARDEN UPON THE TERRACE.

The Terrace Garden—How it takes the place of a Garden—Terrace exposed to the North—Its Trellised Roof—Irish Ivy to cover it—Shrubs to fill the Boxes—Variegated Holly, Alaternus (Buckthorn) Rhododendrons, Great Periwinkle—Terraces of a good Exposure—Running Plants: Honeysuckle, Clematis, Boursault Rose; Bougainville, Chinese Glycine, Virginia Creeper, Buddlea, Clianthus, Delphinium, Hibiscus—Summer Pruning of the Persian Lilac—Watering.

TERRACES on the roofs of houses are not common with us. I shall, however, not omit saying something about gardening on terraces; for, besides that it is very interesting, the flat roofs of extensions and back buildings, answer every purpose so far as gardening is concerned.

Terraces, like the windows of your house, may be exposed to the north, the east, the west, or the south. You already know that, for gardening purposes, the two last exposures are the most favourable; particularly if your terrace has open space enough before it, to permit the air and the sun to reach it without much obstruction.

TERRACE EXPOSED TO THE NORTH.

Let us take the worst hypothesis first: your terrace is fully to the north; in all other directions it is hemmed in by lofty buildings, so that the sun has the right to visit it the 35th of every month, and then only. You have, however, done very well, ladies, to have a terrace constructed, even under these unfavourable conditions. At its centre have a wooden column erected, which is to sustain a trellised roof consisting of four triangular parts. The Irish Ivy will quickly overrun this, covering it with its thick verdure. A round table, through the centre of which the column passes, will be a convenience for placing your books and work upon, also for taking breakfast and tea there, when, oppressed within doors by the heats of summer, you take refuge in the open air, under the shelter afforded by that dense foliage. One side of the terrace being closed by the wall of the house of which it is an appendage, in which wall are the doors and windows opening upon it, erect, at each of the other sides, two arches, from the centres of which vases are to be suspended.

SHRUBS BLOOMING IN THE SHADE.

Just within the balustrade, or the parapet (if it be a parapet) of your terrace, we must have a range of boxes similar to those on the great balcony, which, by our joint endeavours, we have been getting all the good out of that we could. This terrace garden of yours being a northern one, its boxes must be filled with heath soil; and we must rear there shrubs with persistent leaves—variegated Hollies, Aucubas, Alaterni, Rhododendrons. These are among the shrubs which tolerate the shade, and whose robust temperament does not fear the cold, and, with the great Periwinkle for their associate, they will constitute the basis of the decoration of your garden. Add to them whatever ornamental plants I have previously made known to you, as being able to bloom passably well without the help of the sun.

When the heat of the dog days renders coolness precious, your friends will be glad to come and partake with you of that which your Ivy-clad arbour affords: for three months its freshness will be a source of delightful feelings for them as well as for yourself. Do you say this is no great thing? Agreed.

your side, you will have to admit
a great deal better than nothing
l that, as a general rule, it is wise
ik of anything more than it can
—a rule which, applying as it does
errace with a north exposure, as to
: things, must be its protection
nwise exactions.

RRACES OF A GOOD EXPOSURE.

we have effected, in the way of gar-
ipon your balconies to the east, west,
th, you have only to repeat on a
ale, if your terrace garden has one
exposures. Here, however, is the
r some advice respecting certain
of medium and large size, that we
been able to cultivate before, for
room.

INING AND CLIMBING PLANTS.

rellis roof, when it has the good for-
e removed to a terrace with a good
, admits of being clad in a garment
d of the most agreeable mixture of
and running plants, in place of the
y, which, in the nothern exposure,
only covering. Do not be afraid,
o vary and multiply these plants;
l agree very well with each other;
e will take its just share of air and
each will bloom in its own proper
ying with each other, in the most
e spirit possible, in their joint task of
over your head the most charming
that can be conceived.
e corners of your terrace, plant
uckles, Clematis, Boursault Roses,
igainville, to which you may add the
. sinensis and the Virginia Creeper.
limbing up the pillars that sustain
es of the trellis, the Buddlea and the
is will feel entirely at home; nor
y be incommoded by the company
Hollyhock and a fine Ajacis Del-

room which all these will possess
ves of, on the balustrade of the ter-
ll still leave enough there for yourself when you wish to lean on it, and look down upon whatever there may be worth seeing below.

SUMMER PRUNING OF THE PERSIAN LILAC.

On terraces having a western or a southern exposure, besides the boxes serving as the border beds of your garden, there may be others of a medium size, for receiving Myrtles, Pomegranates, Rose Laurels, and a few fine Persian Lilacs.

When the elegant spring bloom of these last is over, do not omit to subject them to the summer pruning. This is a happy innovation, introduced into our horticulture but a few years ago, and already generally adopted. The process is as follows: —

When the flowers of the Persian Lilac have faded, we do not, as formerly, content ourselves with merely cutting off the bunches from which the flowers have fallen; we cut off the tops of every branch of the plant, and, moreover, everything that is green upon it, the Lilac thereby finding itself stripped entirely—no less perfectly naked than at Christmas. But very soon the inherent energy with which the Persian Lilac is endued, manifests itself in a most vigorous vegetation; young shoots, all of equal length, all equally floriferous for the next year, replace the pruned-off branches; and you have a plant the very best of its kind. A necessary precaution, with respect to Lilacs and other shrubs cultivated in separate boxes, is, to turn the box partly round twice a-week, so that each side of the plant may receive, by turns, its just share of air and of light. Otherwise, the natural propensity of plants to grow most vigorously on the best lighted side will cause them to shoot out mostly on one side, whereby the symmetry of their heads would be entirely spoiled, and in the course of a single summer, they would be altogether deprived of grace. When the boxes are turned often enough, the annual growth cannot get wrong set.

WATERING.

When your terrace has a southern exposure, the earth contained in the boxes forming the border requires watering two or three times a-day; the heat reflected from the floor of the terrace, especially when of metal, causing a far more rapid evaporation than would take place in the borders of a parterre having a similar exposure. These waterings, the sowing of seeds, striking of cuttings, transplanting, removing day by day the faded flowers, and gathering of seeds for next year's sowing, will be just so much healthful exercise for you in the open air of your terrace garden.

These attentions and this work—of which you must be careful to do no more than you can do without over-fatigue, without occasioning feelings of exhaustion—will embue you with a taste for ornamental plants; which, becoming more and more lively as you proceed, will finally expand into a real love, such as that with which we love living beings reared by our care. With your sex it, is matter of instinct to love all that is gentle, tender, elegant, and graceful.

Do not imagine, ladies, that the above is all that the garden on the terrace can yield for you in the shape of pleasure arising from the practice of horticulture; there is, besides, quite a different series of facts, which you will appreciate if you will take the pains to read the next chapter.

WHAT NOT TO DO.

LET me tell your readers who, like the writer, have plants in rooms, what they ought *not* to do during these dark days. I was wont to water my plants regularly, and without much discrimination. My Palms, and I have a beautiful Reed Palm—Calamus Etah—that looks so fresh and nice, standing alone upon the dinner table, and my Pelargoniums and my Ficus plants and my Maidenhair Ferns get each their quota of water. I well remember yet how annoyed I was when my poor Fern died, and my Geraniums got worse and worse every day until they actually rotted, stem downwards, and left me, before winter was gone, nothing but the pot and the soil in which they were growing. My other plants were so fresh and nice that I walked over to Covent Garden, and explained the circumstance and results to my seedsman, who had furnished all the plants I had in my possession. He actually smiled at me, which only increased my indignation, —and but that I had asked for advice, I would have retraced my steps and never entered the place again—and told me that I had killed my soft-growing plants with an overdose of water; that the confined atmosphere had aggravated the case, and that I could look for nothing else under the treatment I had subjected my plants to. These were not his words, for he was anxious evidently to make the thing as easy for his customer's feelings as he could, but I could gather up the gist of his observations, and I have inwardly thanked him often since. Indeed, when I began to reflect on my line of gardening, I felt almost ashamed that I should have committed so obvious a blunder. It was a good lesson to me, and, probably, has saved me many a crown piece since, because of the extra care I bestowed upon all matters ever afterwards. I found, indeed, to winter Pelargoniums well in a room, that little water was needed, and that a change of air on every favourable occasion was of great good to them. I found also that even Hart's Tongue and Maiden-hair Ferns did better with me exposed, rather cold than warm, and I have had a nice glass case made which opens from the top outwards, leaving permanent transparent sides. Don't confine almost any plant in a small atmosphere—I mean don't give them, on any account, the treatment of slips when they are growing away, and able to grow on their own resources.—*Anna.*

THE

COUNTRY GENTLEMEN'S MAGAZINE

FEBRUARY 1872

TENANTS AND COTTAGES ON THE SANDRINGHAM ESTATE.

WE extract the following interesting particulars respecting the condition of the cottages and tenants on the Sandringham (Norfolk) Estate of the Prince of Wales, from a letter of the *Times'* correspondent. It will be seen that the Prince sets a commendable example in the way of improved cottages, which we should like to see more generally emulated.

His Royal Highness has often impressed upon landowners the necessity of improved cottage accommodation on estates, and in proof of this we need only draw the attention of our readers to the words used by him at Dublin, last autumn :—" I may just allude, in passing," said the Prince, " to the great improvement that has been made in buildings and the cottages of the poor; still, I believe that improvement has not been made as wide as is necessary for the well-being of the humbler classes. If the humbler classes were well lodged, cleanliness and many other benefits will result." It will be seen from the following that His Royal Highness fully carries out in practice his own ideas on the subject.

The Sandringham estate consists of about 8000 acres, and includes the parishes of Babingly, West Newton, and Wolferton, with part of Deringham. It is rich marsh land where it joins the sea near Wolferton; black sand upon car-stone towards the middle of the estate, and light loam upon chalk, adapted for barley and roots, at the east end, towards Anmer. The estate was purchased by the Prince in 1862.

At Sandringham and West Newton, we find about 7 or 8 feet usually of the black sand upon car-stone. In 1861, this village contained, according to the *Diocesan Calendar*, a population of 300. The census of April 1871, shews a population of 330, but an enumeration of the population which I was enabled to take on Saturday, the 23d current, shewed a population on that day of 295. This points at once to what has evidently been a source of some of the troubles of the village—an influx of lodgers into a village not fitted to receive them, although it has, since the Prince came into possession of the estate, rapidly grown into more favourable residential conditions.

Attention has been prominently drawn to some ill-built and badly arranged cottages. They do not present a fair sample of the present state of the village, nor, unless the whole facts are known, is it possible to draw a just deduction from that which has been said concerning them. The number of inhabited houses this day in West Newton is 62. In this village, however, there are two small freeholds, belonging to small proprietors, and on which are erected, in all 16 cottages, so that the Prince's property in West Newton includes 46 cottages. Of these, 26 are entirely new erections since he came into possession. Prior to that time the village consisted of a number of cottages which are described to me by the rector and others as having been miserable huts like Irish hovels, most of them with one living room and one sleeping room only, many of them destitute of the most necessary sanitary conveniencies, and not three in the whole parish having two bedrooms. Of these cottages, 17 have been pulled down during the last six years, and 26 new cottages built. Three more are to be pulled down. Of the increase of the amount of accommodation thus afforded an opinion may be formed from the fact that for a population of the same number, the number of bedrooms in the cottages of the old property was 25, in place of which there have now been provided 67, an increase of 175 per cent. in the amount of sleeping room. The improvement in quality is even more marked than the increase in quantity. Of the new cottages in the village, there is a row of eight, called the Alexandra Cottages, a group of nine called the Louise Cottages, four cottages designed for old people, and a group of four cottages not yet named.

Of these the Alexandra Cottages were first built, and a brief sketch of these will answer also for the Louise Cottages, which very much resemble them. They are all two-storey cottages, built in the rustic Gothic style, of pleasing elevation, provided with a porch and ample accommodation, built of car-stone, with white and red brick facings, having 14-inch walls, with concreted foundation. Each cottage has on the ground floor a front living room, about 12 by 14 feet, and 9 feet high, well lighted, a back kitchen provided with an excellent cooking stove, oven, and copper, a pantry and coal-house; above, are three good bedrooms, two with fire-places. Detached from the house is a brick outhouse, with kindling shed and sanitary conveniencies. Each cottage has 30 perches of garden ground, and some of them have as much field allotment. The rents of the Alexandra and Louise Cottages, with all their comforts and conveniencies, and with their five rooms, garden ground and allotments, are not higher than were those of the two-roomed huts which they have replaced, or the poor and scanty tenements still existing in the village on the small freeholds to which I have referred.

In going through these new cottages it was pleasant to find them for the most part clean and well kept, and sometimes singularly neat. Many of the garden grounds also were evidently properly valued and carefully cultivated. But not all; and it is evident that some of the cottagers do not appreciate at its worth all that is done to help them and to enable them to help themselves. I was told, however, that a considerable improvement in this respect has been effected all over the estate by the influence of a Cottagers' Garden and Flower Show for the estate, which is annually held in the park in September under the auspices of the Prince and Princess and the clergymen and leading tenantry. Prizes are given to the value of £10 for the three cleanest and neatest cottages and gardens in each parish on the estate.

It would not be right, I think, that I should conclude this report without saying a few words as to certain facts against which I have stumbled in the course of inquiry. It has been seen that during the few years of the proprietorship of the Prince of Wales, he has gone far towards removing from that part of the village over which he has control, all the sources of disease and degradation, and converting it into something approaching a model village. The large number of new cottages which he has built have every comfort and every provision for health and domestic propriety. They have been built at a considerable expense; they are let at very moderate rents. The rate of earnings has risen considerably, meantime, from the increased demand for labour. Every inducement is held out to neatness, cleanliness, order, and good conduct. West Newton has been provided with a school, towards which the Prince and Princess of Wales contribute half the cost of maintenance, besides many little encouragements in the way of school feasts, at which they personally attend and take their share in making the little ones happy, as well as annual gifts of cloaks. The Princess ing her residence at the Hall, comes fre- ntly to the school and takes a class, l the little ones are well accustomed to kindly and gracious presence. For the there is an organized system, by which tors and clergy alike can and do draw ectly upon the Hall for every comfort ich is needed, and for the minor luxuries ich alleviate sickness and hasten cure. A rit of intelligent thoughtfulness and kind- s pervades the whole management of the ite. The schools of Sandringham parish maintained not less liberally than that of wton. Of the game which is shot upon the ite, a large part is presented by the nce's direction to the county and other hos- ils. What is done is carried out merely the efficient execution of General Knollys Mr Beck, and by the rectors of the ishes, of the Prince's general directions. It is done, indeed, in great measure, under his own supervision, by his own wish, and according to his own plans, and the great improvements which have been made on the estate, are due to his own active fulfilment of the highest duties of a landed proprietor. This explains something of that strong personal affection which was manifested by all on the estate during the Prince's recent illness, for he has that happy gift of frankness and kindness of manner which is so much valued by the people. Gentle and gracious, he inherits a strong sense of justice, and a scrupulous regard for his promise. The tenants on his estate have everything to expect from a continuance of that personal attention which he has hitherto given to this fine estate, which has all the elements of salubrity as well as other natural advantages.

TECHNICAL EDUCATION IN HOUSE CONSTRUCTION.

HE following article will be read with interest by farmers, as more than st people they require to look after their ins. We quote it from *Nature*:—

Referring to the recent sad events at Lonborough Lodge, and the disclosures made he medical press, shewing how the whole rnal air of this house was tainted with er gas for want of ordinary care, the *ies*, in an able article which appeared on ember 9, has the following telling sage:—"What a satire on the universal ision of knowledge, on the lectures of the al Society, on hundreds of scientific and cational institutions, and all our new in- tions and discoveries! Here is the plest thing in the whole world, which ted only common sense, and nobody ns to have thought of it—nay, we are not that our architects and builders will be king of it next year. It is far too simple too deadly an affair."

'e purpose to deal with this subject; and in doing so to shew briefly how it is that with every apparent advantage our houses are still not altogether safe to live in.

In the first place, the whole subject of house-drainage has been thoroughly discussed, and simple rules have been laid down, which any one with ordinary technical skill can apply to any conceivable case.

The question has been treated in published reports by the Health of Towns' Commission, by the Metropolitan Sanitary Commission, by the General Board of Health, by the Barrack and Hospital Improvement Commission, by the Local Government Act Office, and recently, by the Army Sanitary Commission, for application in India. These official documents, extending over a period of nearly thirty years, contain all the principles on which wholesome house-conveniencies can be constructed; and besides all this, engineering, architectural, and medical journals have never ceased to advocate attention to the requirements of healthy house construction. The

Legislature, on its side, has been anxiously engaged in defining and granting every necessary power for the efficient carrying out of town-drainage works; but hitherto these powers have stopped short with the house drain. All between the head of the house drain and the interior of our bedrooms hsa been left to chance, or to the imperfect knowledge or no knowledge of such officials as we have seen defending the deadly arrangements of houses, or to plumbers' journeymen or apprentices. The whole experience shews that every official has considered his duty fulfilled when he had ensured an outlet for the refuse water of the house. As to the subsidiary traps, and such like things, they have been introduced without regard to scientific considerations; so that, instead of proving an advantage, they have, in some instances, increased the evil. Now, it must henceforth, be recognized that house drainage is not a question of hydraulics merely, it is in a higher sense a question of pneumatics; but even in this extended sense it is far from being a difficult art, as some would have us suppose. It is by no means a "refuge of despair," as some have asserted. It is a great and beneficial necessity. Because carelessly-fitted water-pipes are burst by frost, and our houses are deluged every winter, are we to have a crusade against water supply? Bursting of water-pipes and the influx of foul air from sewers are indications of want of ordinary common sense; or, at all events, of every ordinary technical skill. And the real future question before us is, not whether we are to abolish household drainage and water supply, but whether some public control in these matters ought [not to be exercised over the proceedings of plumbers' apprentices and other similar persons, so that when we rent or buy a house, we may be assured that typhoid fever, or some other pestilence, is not included in the contract. Every such contract should, however, ensure three things, viz., that water-pipes are protected from frost; that the house is thoroughly drained; and that no sewer-air can, under any circumstances, enter the house. Now all these things can be assured.

It is a mere truism to say that there are plenty of non-conductors of heat with which water-pipes can be efficiently surrounded. Why should water-pipes be left uncovered under flooring or in walls, as at present? Surely any local authority could deal with so simple, and, at the same time, so importanta question as this.

As regards efficient drainage-pipes, traps, and the like, there are great manufacturing interests involved in the production of these, and any one who will cast an eye over the advertising columns of our architectural and engineering contemporaries, will see how much ingenuity and wholesome competition there exists in the production of the most scientific forms of apparatus of this class. But the missing link in the whole of these drainage arrangements is how to prevent foul air entering the house. In an ordinary second or third-class house in London, there are three or four water-closets, the main pipe from which enters the drain, either directly or through an inefficient trap. It may be safely stated that at all times there is more or less pressure of sewer air on the pan or trap of the closet, which must lead to an infiltration of foul air into the house. But nobody appears to have applied the long-known remedy for this, viz., to take off the pressure by a small leaden pipe carried from the upper end of the soil-pipe to the open air.

It is not, however, from the soil pipe that most of the danger arises. Houses of the same classes have generally what is called a safe under the water-closet, from which safe a pipe passes directly to the drain. Next there may be a bath with its outlet pipe, its overflow, and the pipe of its safe, all connected with the drain. There may be three or even four sinks all connected with the drain, and then every cistern has its overflow, also connected with the drain. As these various open pipes are distributed all over the house, we can easily understand how, while fulfilling the function of removing waste water, they may, in conformity with the laws of pneumatics, distribute the most deadly poison among the unconscious sleeping inmates of every bedroom.

ul sewer air returns into an house for ollowing reasons, viz.:—1. A wind- ıre exercised on the open mouth of a perhaps many miles away; or a similar ure exerted on an ordinary gulley grate. y pressure of foul air into the house from ıperior specific gravity of the atmosphere le. 3. The draught of chimneys when and windows are shut during the night. draught must be supplied, and will ly itself from every one of these small , perhaps a dozen or more in a house, cannot be supplied more easily else- e.

ıe principles to be kept in view in deal- with defects such as those stated are ous enough.

ıe general drain system of every street istrict should be studied as regards its matic relations, and means should be ted for relieving the pressure within the m by ventilating outlets in safe positions. lacing charcoal strainers at all these ts, sewer air would be deprived of its uctive qualities before passing into the ts. In special cases provision would to be made for preventing the tide or g winds from entering the mouth of the sewer.

ıen as regards the household drains. e is nothing easier than to ventilate the ipes through charcoal filters in the ıer stated. And as regards the numerous l pipes of sinks, baths, &c., not one of ought on any account to communicate tly with a sewer. They ought all to be cted and allowed to discharge their ents in the open air over a trap commu- ing with the house drain, so that reflux wer gas into the house would be simply ssible.

Much evil has in times past arisen from imperfect drains within houses. Properly, there should be none such. All connexions of water-closets, sinks, baths, &c., with the house drain, should take place outside the house walls, and where from bad construction drains have been laid within houses and cannot be altered, they should be replaced by glazed earthern pipes laid in concrete, every joint made perfectly air-tight.

Cess-pits and traps ought never to be permitted within walls. The trapping should be all outside.

From want of attention to these long-known principles, most of our houses are sick, and require separate diagnosis and treatment. They can all be cured if we only could find an authority to undertake the cure.

Were it not that in many instances we should have men of straw to deal with, we should feel disposed to advocate the application of Lord Campbell's Act to these cases. But as the recovery of damages would be a remote contingency, why should not Local Boards of Health, with their highly-paid health officers and surveyors, be required to to see not only that all the details of water supply and drainage in new houses are safe, but that unsafe houses are made safe by their proprietors, or condemned as unfit for habitation?

After all is done, however, the chief remedy must be sought in technical training on all house questions in the application of which scientific principles are involved.

It may be safely stated that there is no technical subject of greater importance than this, and our recent experience has shewn that there is no subject on which more training is necessary than to build a comfortable healthy dwelling.

THE ADVANTAGES OF FARMERS' CLUBS.

THE following article, taken from the *Albany Country Gentleman*, will be read with interest, as there is sound common sense in it:—

A farmers' club should be a farmers' conference, where all can come together and not only impart and call for information, but talk over all matters in which they are interested. Not a little useful information is brought out in general conversation, both before and after the regular discussion. Feeling more freedom, many men who have been led to thought and conversation by what they have heard, then talk freely. There is much social enjoyment and satisfaction experienced in this way, and this is not confined to the meetings. Many talk over the various matters and ideas brought out when at home as well as with their neighbours, and thus the influence of the discussion is largely extended.

The regular discussions of the club should be conducted with as little formality as possible; members should address the chair, and usually rise when they speak; but if any one who has never been accustomed to public speaking should wish to make statements or ask questions from his seat, he should be allowed to do so; many men will thus furnish or call out useful information, that could not be persuaded to stand up and do it, but in time they may acquire confidence and talk as freely as any one.

The questions for discussion should relate to matters of immediate interest at the time; as, at the commencement of winter, the care of stock; the prospects of the meat markets, both live and dressed, and any other questions that farmers are naturally led by their interests to talk over at the time. It is well to devote a brief portion of extra or preliminary business, as questions and answers, or matters not directly appertaining to the regular question for discussion. This chance for obtaining information may induce some to attend who otherwise might not think of coming.

The leading object of a good farmers' club will be to promote production. How to grow crops, raise stock, manage the dairy, and produce wool, as well as the different kinds of meat, are all questions of the greatest importance, and are not in the least danger of being too fully and thoroughly investigated and discussed. These questions are always in order, though of course the preference will be given to the branches of farming more generally practised in the sections where the clubs are located. To promote improvement and success in these branches, will of course be the leading object; but there are other incidental and collateral questions growing out of them, that of course will receive a share of attention. Not the least of such questions which are of interest and importance to farmers, are those relating to marketing and transportation of farm products. Closely relating to these questions, are those relating to the prospects and yields and amount of the various crops and farm products, as they are made ready for market. More accurate knowledge on these points is greatly needed. Farmers' clubs should be made one of the most effectual means to draw attention to these matters.

Besides direct improvements in all things relating to farmers' pecuniary interests are those relating to mental and social questions. Farmers should practice public speaking, so as to be ready on any emergency to advocate and take care of their own affairs. They should also become accustomed to writing with clearness and precision, which will be found of no little advantage on many occasions. For the practice of both there is no better time or place than the farmers' club. There is no critical editor to refuse the communication, and no sharp lawyer to pick his

to pieces; but there rather is, or
e, every encouragement both to
l write. Then with practice many
ne able to speak almost anywhere,
write communications suitable for
nals. These men will become more
t, and much better posted than
might be the case. If a man is to
is pretty sure to think of some-
ay; if he is to prepare a paper to
have to read, he will give some
and study to the subject he is to
as he will feel pride and satisfaction
g up a good paper; while this
study and practice in speaking or
s well as that of others, of which he
ve a share of the benefit, will be no
p in promoting general intelligence.
he club is of no slight advantage in
point of view. Farmers, from their
location all over the country, live
t isolated lives—in many cases de-
so; while in few sections are they
sufficiently near for the best social enjoyment. By bringing them more often together, and making them better acquainted, the meetings are a very good remedy for this isolation.

By getting better acquainted, and becoming more accustomed to speak and write, they are better prepared to act together as one body. Merchants and manufacturers understand the great advantage of thus working together; and their various associations, through the agents they employ, are able to secure nearly all laws for their special benefit that they may desire. Farmers are greatly superior in numbers and voters, and have men enough of sufficient ability to secure all they want, were they accustomed to act together and thus make their power felt. But this they have not yet learned to do, and the farmers' club is the place to begin. I is for farmers what the common school is for education—it is the foundation upon which the great superstructure must be built.

THE DORSETSHIRE AGRICULTURAL LABOURER.

By the Rev. T. Bennet.*

aking of this topic, bear in mind I
alluding to the agricultural labourer
simple. I am not alluding to the
, who has more pay and perquisites,
he is entrusted with the care of
the meat of which, at 10d. per lb.,
thing of the gold-procuring fleece,
aluable. Nor am I alluding to the
ho is a village Pickford, often en-
ith the conveyance of very precious
with no other insurance but his
onesty. The man is always com-
who calls a spade not "an imple-
husbandry," but simply "a spade."
n I speak of an agricultural labourer,
allude to a foreman, a shepherd, or
but exclusively to the lowest grade
—the agricultural labourer. I wish this to be distinctly understood, so as to narrow our deliberations to the worst paid and most necessitous class of the community, viz., the Dorsetshire agricultural labourer.

AN AMERICAN ON LABOUR IN DORSET.

What is the actual state of the agricultural labourer? I take up a little pamphlet, entitled, "Letters on the Large Farm System," &c., by George C. Miall, an American, and I read extracts from this book, not as endorsing them, but in order that they may be refuted, if untrue or exaggerated, by the experienced friends I see around me. In the 1st page, Mr Miall says—"In the county of Dorset, where the farms are very large, and the labourer's pay is very low, women receive 6d. a-day in ordinary time, and 1s. 6d. when

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before the Dorchester Farmers' Club.

there is extra work," &c. On pages 14 and 15, I read the following:—"The amount of wages paid, and the religious, moral and social condition of the English agricultural labourer, is absolutely disgraceful to a country which boasts of her civilization. Our 'Saturday Reviewers' and 'kid-gloved' writers generally ignore this state of things altogether. Here are the facts—The Dorset labourer's weekly pay is 8s.; and in addition to this, he has 'house, firing, and cider,' and in some cases other small perquisites, which, of course, depend entirely on the disposition of his master or employer. In some cases they get ground for planting potatoes, and 'allowed' to keep a pig, but in most cases the large farmers prohibit their labourers from keeping stock of their own. The 'house' is in many cases, a mere mud hovel, not worthy of the name, if they are lucky enough to get one at all. The 'firing' is the furze or gorse which grows in large tracts on the hills, and affords better shelter to the game of the 'squire than it does warmth to the hearth of the poor labourer. The 'cider' is cold, thin, watery, sour stuff, which does him far more harm than good, and it is often 'doctored' in harvest time in order to excite the poor wretches, so that an extra amount of work may be got out of them. Parliamentary Commissions have told us of the immorality caused by the overcrowded state of the labourers' cottages. No one can reside for many weeks in an English village without becoming aware of this state of things. And no wonder, when we consider that the ordinary dwelling of the labourer consists of but two rooms—one for eating, cooking, and for all other purposes, and the other for sleeping. I know myself dozens of cases where the father, mother, and six or eight children, grown up or otherwise, occupy the same sleeping apartment, and even bed during the winter, all huddled together like a litter of pigs for the sake of warmth. The only wonder is that the poor creatures are not worse in morals than they prove to be at the present time. What a satire this state of things is upon the recently-passed Elementary Education Bill and the endless wranglings and bickerings over it. The higher classes fighting about who shall control the religious opinions of the children of the peasant, and at the same time they will not allow the parents proper means to live commonly decent. With the present low price of wages, compulsory education in the rural districts is an impossibility. The large farmers won't employ single men, or married couples without children. They like a man with a large and rising family. They insist on the boys going to work at about ten years of age, and the girls at about fourteen. Besides, how could a man maintain his family without the aid of his wife and children? When the labourer returns with his family from their daily toil to their evening meal, which generally consists of an immense pot of vegetables, flavoured, perhaps, with a small scrap of pork or bacon, where are his home comforts? He is only too glad to exchange the rude cheerless cottage for the roaring fire of the neighbouring beer-house, where he can spend the evening over 'a pint of beer and a pipe of baccy,' and a dance, may be, on Saturday nights."

THE ECONOMY OF THE LABOURING CLASSES.

What sort of quality can a man maintain on 8s. per week? Put yourself in his place. How could you get on with only the bewildering income of 8s.? Mechi says: "The economy of the labouring classes must be truly wonderful." One-half the world don't know how the other half live. And this 8s. a-week problem is one that I fondly trust none of us may ever be called on practically to solve. Talk of luxury, talk of even common beer! To paraphrase *Punch* slightly:—

"Eight shillings a-week, with wife and kids to feed,
Don't leave a fellow much for beer indeed."

And yet so far as dignity is concerned, is it not in reality great?

And yet there are those who, from their pride of place, look down upon the labourer as if he were a mere "serf" or "hind." Even their employers do not shew that interest in their welfare that one might reasonably expect. There is too much of intolerable pride stalking haughtily over the land; too much of the unlovely spirit of "caste;" too isseverance of class from class. What the practical experience of Mr Scott on this subject? After viewing this in comparison with others, he says, e come to the conviction that the elations between the different classes ty in England are too intolerable to g; they must either be speedily and cured, or they will suddenly cure lves."

TEMPERAMENT.

lition means state of the mind, temper, ament, and complexion. The com- of many of the labourers is florid, nd bright and rosy as their master's Like David, they are "ruddy, and r countenance." The temperament of rsetshire labourer is truly polite. I oticed genuine refinement of feeling ral of them. They are "Nature's ien and Nature's gentlewomen." er," said a bishop, "is nine-tenths of nity," and, considering their trying ir tempers are admirable. Seldom do ar angry expressions. All this is the emarkable as they take few pleasures. are not many more things tend more eten the temper than amusement; but our labourers have not. Even the n do not play with the same vigour as n other counties. Happily we do not f degrading sports and amusements st our people, like the bull-dog fighting fordshire, and the Sunday dog racing cashire. But cheap excursions, cricket, l, and such like, are things almost un- to our rural population. Something e done to encourage harmless pastimes ersions, remembering the trite obser- "all work and no play makes Jack a y;" aye, and a dull worker, too. And ith regard to women. It has been ed that shopping is to ladies what g is to gentlemen; but our poor Dorset have very little money for this. Lord Godolphin Osborne lately spoke this vice of over-dressing, coining the lressard to fully express his meaning. h their meagre pay few of our labourers' wives or daughters, if ever so much inclined, can afford to be dressards. And in this matter it would be well if those above them set a better example, and dressed with more shamefacedness and sobriety, and gave the money, thus saved, in charity; remembering what the genial Goldsmith says:—"The nakedness of the poor might be clad from the trimmings of the vain."

MORALITY IN THE RURAL DISTRICTS.

Condition includes "moral quality, virtue, or vice." How are our people as to morals? Professor Buckman answers, "The morals of the people are weak and unstable, like the Dorsetshire fences! Many of the young people marry themselves before the clergyman marries them." Where glove-making is carried on the females are more generous o their charms than even in other parts of the county. Glove rhymes to love, and illicit intercourse is drawn on. "Love" children are plentiful in the county, and the first child I was ever called upon to christen after I entered on my duties at Wynford Eagle was called by this name. The mother, not being then a married woman, instead of being ashamed of giving birth to an illegitimate child actually insisted on branding it with this name, and "Love" the child was called at the font, and "Love" it will remain to its dying day; a "love" child, it is called "Love." I spoke about there not being many dressards amongst our agricultural women; nor are there many habitual drunkards amongst our men. There are several hamlets and villages in our county where there are no drink shops or public-houses. Around Maiden Newton I know of seven parishes where there is no house for the sale of intoxicating drinks, and, as a result, drunkenness is almost unknown. I hold two such parishes unsullied by the liquor traffic, and I am happy to say I do not know a working man in either of them who is a drunkard. We pray, "Deliver us from temptation," and where there is no dram shop one great temptation is removed. The tired labourer is not then assailed at his weakest moment, when he returns fagged from his work, by the bland president of beer barrels and spirit flasks. There is, I am afraid, a good deal of filthy talking, and some of the women are very foul-mouthed in their language. I have heard of a nobleman who was kept awake during several hours of the night by the lewd and indecent talking going on under his window as he lay on a bed in the village inn about 8 miles from this county town. The fountain of the human heart must be very impure from whence flows the libidinous talk of field labourers of both sexes. There is not much more attention paid to the ninth than to the seventh commandment, and one neighbour thinks very little of robbing another of the treasure of a good name, more precious than silver or gold.

THE EFFECTS OF HIRING FAIRS: WAGES.

What are the conditions as to the hiring, &c., of the agricultural labourer? On the 14th Feburary (Ash Wednesday in 1871), the Candlemas fair is held for hiring labourers. Who is there who approves of this system? Do the masters? Do the men? Is it not rightly called mop fair, from its mopish gloomy nature? Does it not make dismal those that attend it? We have heard of slave markets—is there nothing of the nature here? Slaves are trotted out; put through their paces like horses under the auctioneer's hammer. Now, I ask, is not this turning out another name for putting him through his paces, to see if he is sound in wind and limb, something very like what Mrs Beecher Stowe tells us about the American slave market of former days? I ask again, is an open fair a good place in which to make an agreement? Does not this annual hiring generate a most unsettled restless feeling between employers and employed? Is not the bargain very like "a pig in a poke" on both sides? The master can know nothing of the man. As to payment. In antient history we read of work so highly esteemed that the labourers were paid daily in gold. And agriculture is of such vital importance to the community that its labourers should be adequately and punctually remunerated. When I had labourers myself in Ireland, I always paid them on Friday nights, and some of them for task work—making drains—drew as much as 19s. per week during the short days of the winter months. I think, with many others, that all perquisites should be abolished, and that the Dorset labourer should be paid in money every Friday night.

IMPROVEMENT OF THE LABOURERS' CONDITION.

A labourer is one who takes and requires a good quantity of food. He does much work; he wants much food. We hear of feeding a horse in proportion to his work. The same principle ought to obtain with the labourer. He has to work hard, and therefore must "keep up his pecker." We have spoken of the condition of the labourer. We have taken the word painting of some of those who use the darkest colour. We now come to inquire how this condition may be improved. I proceed, therefore, to offer some suggestions, in the hope that they may be largely improved upon and increased by the members of our club. What are the helps and aids that may be afforded to the labourer and his family? 1. "Clubs." Motto, "Help the poor to help themselves." Clothing clubs, with good handsome premium added. Then, again, the great principle of co-operation, which works so well in towns, should be largely extended to the country; and every village and even hamlet should have it's distributive store, where good genuine articles might be purchased at a cheap rate for ready money. The sacred oracles say, "Owe no man anything." But this is a command more honoured, I fear, in the breach than in the performance. Debt prevails to an alarming extent. It is well to establish a system of prizes for the best and most productive cottagers' garden, for the cleanest cottage, best roots and vegetables, best bread and best honey, &c.

Privileges.—Under this head we may mention skim milk, at a nominal cost of, say, ¼d. per quart, or, better still, what Lord Nelson recommends to his farmers—viz., to start a system of small cow lands to be let to labourers of good character who have saved £10 or £20. The privilege of keep pig, to supply meat for the cottage nd manure for the cottage garden. ivilege of keeping poultry, to supply ily with eggs. An egg is generally at about 1d.; taking it at this, where get a greater amount of nourishment money? The farmer, too, might buy f pork, cheese, &c., by the cwt., and t them cheaper, and dispense at cost his labourers. In harvest time, beer e recommended for labourers rather ler. There is more stay in the former. ers' dwellings should be constructed with proper regard to health and decency. And it might be desirable that every twelve householders should elect some wise and discreet man from among themselves to be a sort of father to the rest, to look after broken glass, drains, roofs, and various little et ceteras. Owners of labourers' cottages might be required to take out a licence, costing a nominal sum, at the beginning of every year. Each house to be licensed to accommodate only so many as it was capable of doing with decency, a fine to be imposed for overcrowding.

THE SUPPLY OF AGRICULTURAL LABOUR.

By Capt. HORTON, R.N.[*]

IS question, Captain Horton said, was one of high national importance. in fact no less than this, "How best succeed in maintaining a supply ur suitable to meet the present re- nts of agriculture?" This problem be solved in the face of the fact that ditions of labour in all branches of were undergoing great and constant nce, and that they had already to ith a generation of labourers much structed, and, as a consequence, more than heretofore.

CLASSIFICATION OF AGRICULTURAL LABOUR.

Captain Horton's) career in the navy rded him some opportunity of arriv- ertain conclusions with reference to ect. Both the army and navy offered atures suggestive of example not un- of imitation elsewhere. The analogy ndry with the army and navy existed so far as the extent of the work to ormed, for the organization of agri- labour seemed to be in no degree equal to the demand for it. A farmer had under him, perhaps, a bailiff, then a waggoner, shepherd, stockman, and those who work immediately under them, with certain other men and boys not in constant work and apt to be paid off during many consecutive weeks at different seasons. Happily this state of things had been in a great degree modified through the introduction of machinery; but it was important to consider how it might be still further improved, and the employment of labour become more uniform throughout the year. He pointed out the evils which result from men having uncertain work, and proceeded to compare those engaged in agricultural labour with the same class enlisted in the army, or brought up in the navy. Taking the average wages (including haysel, harvest, &c.) of agricultural labourers to be 16s. a-week, as had been stated by a gentleman who had been at pains to calculate it, he said the corresponding money value in the navy was represented by an able seaman of the first class. This man, for misconduct, might be reduced to the second class. Below the A.B.'s were the ordinary seamen whose wages were about £4 a-year less, and who were also divided into two classes, and then the boys, who form two classes, according to their age. A somewhat analogous classification existed in the army. He classed the waggoners, shepherds, cowmen, and engine-drivers as corresponding with able seamen or private soldiers of the first-class, and the men next them in each department ready to supply their places with the second class, whilst the third class might be made to include all the remaining bone and sinew of eighteen years old and upwards. Lads might also be classed of the first and second class.

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[*] before the West Suffolk Chamber of Agri-

IMPROVED SYSTEM OF ENGAGEMENT.

Very great advantages would accrue both to employers of labour and those they employed, if the farmers were to adopt a system of engagement, whereby they should have it in their power to stimulate and reward the better energies by advancement in grade and wages. The same system would also strengthen their hands with reference to their less industrious labourers by enabling them to reduce their grade for continued dereliction of duty. By this means the farmer could from week to week impose a fine upon his men if they failed in their duty or engagements, while he must impose upon himself a sense of the duty which would attach to him of conferring the rewards upon deserving men without delay, as well as that of administering the penalties in strict justice and apart from the influence of any momentary irritation. How many a man was now turned off a farm almost without a hearing because his master had no other means at hand to punish him! And on the other hand how many a valuable man was induced to quit his parish and seek work elsewhere, because he found his family increasing while he had no prospect of improving his condition so as to be able to maintain his position. The system he proposed would offer great facilities for the adoption of piece work. If the system were adopted in a district there would follow a system of certificates of service to the men in each class which would facilitate their employment by other masters, and he advocated the establishment of a kind of labour office after the manner of a domestic servants' registry. Among the advantages of such a labour office, he mentioned that it only required that some facility of intercourse should be established for a more regular distribution and employment of labour to ensue, and he gave an instance which shewed the small amount of regard which men bestow upon the distance they have to go to work.

AGRICULTURAL GANGS: EDUCATION.

Captain Horton then made somewhat lengthy quotations from the paper of Mr J. Dent, M.P., on the present condition of the English agricultural labourer, in the Royal Agricultural Society's *Journal;* and on the question of the employment of women in agriculture, said he did not hesitate to state it was his opinion that they would do wisely to encourage the employment of female gangs according to the provisions of the Act, to assist in getting some of the thistles out of the land. In conclusion, he said personal activity and quickness of movement on the part of the labourer were qualities valuable to his employer. They require cultivation in youth, as much as maintenance during manhood. This was a difficult matter, but well-shod children taught to use their limbs with activity were all the more likely to prove useful labourers under a system of payment, which, by the promotion or reduction of a labourers' class and position on the farm, would cultivate in the minds of the men the sentiment of self-respect which was an agent far more powerful than money. Those were wise words of Lord Treasurer Burleigh's to his son—"Keep rather too few than one too many. Feed them well and pay them with the most, and then mayest thou boldly require service at their hands."

AGRICULTURAL LABOURERS' DAUGHTERS.

ricultural labourer and his wages, ʼants, his wishes, have during the ıths formed the theme of much d interesting speechifying. With remains to be seen. We are not ıe that he will be greatly bettered ch speaking" about his condition. ɛe that of a not very tractable ıave read of, will, we are afraid, : little wool, unless those who in ːar to have Hodge's welfare so ɜart, in private exercise their in- his behalf with their landlords, ir everyday practice, shew that ːlves would really like to see him world, and would do all in their sist him in doing so.

ɜaders are aware, we are not of ı the matter of wages consider that he agricultural labourer is ground than that of the unskilled worker On the contrary, we think that, the northern agricultural districts, account his perquisites, and the has no broken weather, no deduc- ːs from year's end, to year's end, ıetter off than the like class in the , undoubtedly, his home, as a rule, ɔm comfortable, and, although even the worst habitations in the coun- ıe pointed out in towns, there is ːxcuse for the existence of such ıe rural districts. Land is cheap, y parts building materials can be ʳ to hand. Were landlords gene- ɔw the noble example set them by of Wales, and many noblemen ıen, it would be greatly for the .l connected with the agricultural

ng built good cottages for our labourers, we must do something e we can make them comfortable ontrast favourably with the public- is not sufficient that the rooms should be light and airy, we must have some one in them who takes a pride in keeping them more clean and unspotted than the nicely sanded floor of the tavern. A slatternly wife soon makes the neatest house untidy, and her husband careless and disgusted. This being the case, we are glad that the Ixworth Farmers' Club has taken up the question of the education of labourers' daughters. This is beginning at the right end. Educate young women in all that appertains to household duties, teach them how to bake, to brew (when the Malt-tax comes off), to cook, to sew and knit, and with a comfortable cottage—one within which cleanliness can be exercised with effect—there will, we firmly believe, be few causes of complaint about the improvidence, the drunkenness, dissatisfaction and debauchery of agricultural labourers. This is what was suggested at the Ixworth Farmers' Club, and with a view to encourage girls to engage in such work, it was suggested that some money should be given out of the funds of the Club in the way of prizes—a suggestion, however, which does not appear to have been carried out.

The idea, however, deserves hearty support. We trust the good work will be taken up, and carried through on a more extended and systematic scale than it could be done by any merely local society.

We may observe that we do not agree with the opinions expressed by some parties in regard to the employment of women in the fields, and that by such labour they are more degraded than others of their class who confine themselves to in-door work. There are many of the finest agricultural districts in the United Kingdom, where, in the turnip-hoeing season, and at the corn and potato harvest times, it would be simply impossible to do without women. As well stop seed time and harvest altogether. And in these districts we know that no greater immorality exists than in others where women do not work outside.

THE EDUCATION OF LABOURERS' DAUGHTERS.

IN discussing the education and condition of agricultural labourers, subjects which have received a great deal of consideration of late, many speakers and lecturers altogether ignore, or if they do not do so, only casually allude to the case of the female population of the rural districts. We are glad to notice, therefore, that at the last meeting of the Ixworth Farmers' Club, the subject of the education of the daughters of agricultural labourers was taken up, the first paper read was that by Mr George Gayford, jun., who was of opinion that to improve and encourage the female members of the labourer's family they should be inculcated into attention to and proficiency in the performance of such plain, practical duties of every-day life as would tend to make them good servants, wives, and mothers. He had used the plain old-fashioned word teaching, as he did not wish to enter into the general question of education, preferring to leave that in better hands. They might compare the teaching of a child to the rearing of a building—both required a sound and good foundation. How were children to stand the trials and troubles to which they would be exposed, unless a good foundation was earlylaid by practical and judicious teaching? He would not enter into the question of whether the present system of education was right or wrong; but he would say, without going into such questions as that, it appeared to him that it was their duty to endeavour to lay a sound, solid foundation by trying to teach and encourage those plain duties of everyday life which they knew must be well performed by the wife, if a man's house was to be made comfortable and happy. It appeared to him that this part of the teaching of the daughters of agricultural labourers had been, and still was to a certain extent overlooked; and he thought they would all see there was an increasing tendency to allow a regard for mere outward show and fashion to take the place of utility and comfort effect an adoption of plain and natura in the minds of labourers' wives daughters, he said that teaching, bo ligious and secular, was greatly neede suggested that the club should appro from its funds such a sum as they could to be devoted to giving prizes to the dau of agricultural labourers for skill in making, plain-sewing, mending clothe stockings, knitting, or any other bra industry likely to be useful to them, or special cases of merit or good conduc

Mr R. GREEN, a schoolmaster of Ix also read a paper on the subject. Th cation of the labourer's daughter he h be a very important subject. It was the class of the daughters of labourer their servants came, and who, as such, exercise an influence for good or fo over their children, and who would after their own marriage, as mothers future generations of their class. (farmers of all classes) knew that goo would not come of its own accord, experience had told them that as mu tention need be paid to the growing as ripening season, and he would ask th they had hitherto taken any interest i training of young girls. Had they thought the education of the agric poor a matter for their own conside and benefit?

WANT OF COTTAGE ACCOMMODATIO

In my opinion, said Mr Green, the root of the evil, in many parishes, is th of proper accommodation in the cotta the poor. What is the use of talking decency and respectful conduct to a gi has passed most of her young life in a ing-room with men and boys? What use of teaching morality while such a st things is allowed to exist? But it is "We know it, and are sorry for it, b help it." I ask, "Do you try?" y importunity, get even more than they Why should not every farmer say andlord, "I can employ so many men; e up as many good cottages, and let them with the farm, so that I may me influence over my workmen?" system, carried out properly, would at help to destroy the present state gs in over-crowded cottages, and, he management of the farmer and his ere might be a special interest taken assistance given to remove what may d the next great evil and hindrance ation; I mean, the want of moral at home. I don't want to see our rs treated as serfs or slaves, but I think cases a little judicious compulsion made use of in this great failing, with enefit to both parents and children. the labouring poor, the parents seem all moral control over their children he age of nine or ten years. "Forced ," it is said, "are not good for the ut I have not seen, in parishes where ire's lady had absolute control, better s and better mothers, than those pro- from parishes where everybody does ich seemeth right in their own eyes— hes where this one lady is not. Why not the employers of labour use their e to incline the parents to more care- ing, and the children to understand essity of obedience? This kind of aid greatly help, if not entirely effect a . Should they refuse to accept these ses, then, I say, put in a little sugar ce the medicine down their throats.

FICIALITY OF DRESS—GOVERNMENT EDUCATION.

next obstruction to a pure education cheap and easy means of obtaining n dress. Oh! for the days of neat white caps and sensible-sized aprons, instead of the make-believe things worn by servants in these days. This is a very difficult and a delicate question, but I cannot help saying that example is better than precept, and when we see well-educated young ladies with their Alexandra limps and Grecian bends, why need we be astonished at ignorance aping the manners and dress of its superiors? One thing I would strongly impress upon ladies, if they were here present, never give away anything to poor girls which may be converted into useless finery. If they give, let it be something neat and useful. I now come to the last but not least of those things which militate against the education we all so much desire—the present system of Government education. How can it be expected that the teachers should take the same interest in teaching the heart when their employers and paymasters, the Committee of Council, ignore that King of teaching? Is it not natural that they should attend most to that which brings in the needful to support them? Is it right that a nation should support such men as say to a girl (in effect if not in words), "I care not whether you are taught the religion of your Saviour or not, but at ten years of age I expect you shall be able to manipulate perfectly all the questions which may be put in our puzzling weights and measures?" Is it fair to tell the schoolmistress, "You may teach needlework in the afternoon, but you shall bring your girls up to the standard of the boys at the same age, or you shall be plucked?" In other words, "You shall perform your tale of bricks, but you shall have no straw." I tell you honestly the Government system, according to the hard and fast line, by age standards, is nothing but a system of cram, and will never, as a rule, produce what is most wanted. It is all artificial and on the surface, producing contempt for hard work, and a conceited superiority over one's neighbours.

AUSTRALIAN COOKED MEAT.

A GOOD deal of attention is being bestowed upon the question how to supply the poorer classes with butcher meat, at a cheaper rate than is at present demanded for that description of food in this country. Australian cooked meat is beginning to supply this want very extensively; and we are glad to find that a reaction in favour of this preserved food is evidently setting in. Companies are being created for the purpose of preparing the meat on an extensive scale, which shall enable the working man to feed his family with good palatable food at half the price he is now compelled to pay.

It is not long since the master of St Mary-le-bone Workhouse made a special report to his guardians of the actual weight of cooked butchers' meat obtainable from a given weight of raw meat as supplied, bringing out the result as 27⅝ per cent. loss on beef and 36¼ per cent. loss on mutton; while more recent experiments have shewn that raw meat costing 10½d. per lb. came out by the loss in cooking, and by the weight of bone, exactly 1s. 5d. per lb. With this price, philanthropists who desire to conduce to the well-being of their poorer fellow-countrymen, have compared the cost of the admirable Australian cooked meat, preserved in tins, which is now sold, free from bone, at 6d. or 7d. per lb.; and it is satisfactory to know that their efforts have been so far successful that the stock of Australian meat now in the market, which a short time since hung heavily on hand, is now unequal to the demand; that a shipload recently arrived was disposed of before the vessel reached the docks; and that there is now a fair prospect of the immense supplies waiting for utilization in our Australian colonies, and in the great cattle and sheep producing countries of the River Plate being brought here as rapidly as the people can be educated to take advantage of the boon offered for their acceptance.

The only valid objection ever offered to Australian preserved meat by those who have been induced so far to overcome the common English prejudice against novel food as to try it, is that it is overcooked, and sometimes it has only just a *soupcon* of the flavour of the tin. A public company is now in process of formation for working, on an extensive scale, a process of preservation which has been practically tested on a commercial scale in Aberdeen, by which both these objections are obviated. Lately (says the *Daily Telegraph*), a gathering of merchants and gentlemen, principally connected with our Australian and New Zealand Colonies, and with the River Plate, took place at the Cannon Street Hotel, to hear an explanation of the system, and to submit fish, flesh, and fowl thus treated to the gastronomical *experimentum crucis*. A bill of fare, consisting of cod, haddock, fowl, grouse, partridge, roast sirloin of beef, round of beef, and boiled leg of mutton, was discussed with evident gusto by gentlemen not likely to be satisfied with inferior food, and a general opinion was expressed that the consistency of fibre and the flavour of the various substances were retained in a much higher degree than by any other system of preservation in use. All the tins of food opened for the luncheon had undergone the test of voyages to and from the tropics; but, so far as any flavour was concerned, it could not have been distinguished from similar articles from the larder of the hotel cooked twelve hours before. W. D. Christie, Esq., C.B., late Minister to the Argentine Republic and Brazil, the chairman of the new Food Preserving Company, presided, and explained that the object was to work Mr Richard Jones's vacuum system of meat preservation, and to acquire, first, a going concern at Aberdeen, now worked by Messrs Forbes; then to start a factory at the Hunter River, New South Wales; and finally to carry out the process th America. Mr Forbes explained that d process of preserving was to put the nto the tins raw; then to place the tins hloride of calcium bath, by which a rature of 225 deg. could be attained. on as the meat attained a heat of 212 e the centre, the small aperture in the the tins, by which the steam escaped, ldered, and the operation was comple- r submitting the tins to a heat of 265 or half an hour, by which the meat was etely preserved, but at the expense of ooking and some loss of flavour. In nes process, the tins are connected by s of a little tin spout on the top, and an ubber tube, with a vacuum chamber, abstracts the air from the meat and the mediately, and allows the heat to pene- nore rapidly; so that in effect the con- f the tin are roasted rather than stewed, vour and consistency of fibre being as reserved as in a joint cooked at the n range. Some fine joints of beef, pre- l with the bone in them, were on the shewing the principle to be applicable its, where appearances are considered, l as to the masses of solid meat, which, as matter of economy, is always tinned in Australia.

Unequivocal testimony was borne to the success of the process by shipowners, who have used meat so prepared for their passengers, and the usual startling statistics were given of the mass of animal food waiting for consumption at the antipodes. One gentleman connected with Australia declared that 15,000,000 sheep and 1,250,000 cattle could be spared annually from the different colonies as surplus stock, and the representatives of the River Plate claimed for those regions at least an equal capacity for food supply. Being descended from our own choicest stocks, there seems good reason for the claim set up for equality between Australian and English meat; though one may venture to doubt the strict accuracy of the South American enthusiasts, who insisted on the food value of River Plate flocks and herd being equal to any in the world. A discussion took place as to the means of introducing preserved meat to the poorer classes of the country, and a general opinion was expressed that food prepared by the new process would much facilitate that desirable consummation.

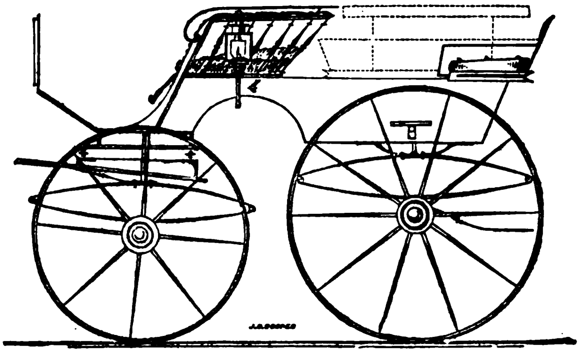
CARRIAGES AT THE SMITHFIELD SHOW.

IE cumbrous and unwieldy vehicles which used to roll over the almost able roads of olden times, have been y giving way to newer and more modern actures of this character.

er roads have made it necessary to seek ore elegant means of conveyance than ly existed: and now that Mr Lowe has gradations in the tax upon carriages, sing or decreasing according to weight, s are using every means within their to build carriages of a lighter de- on, at the same time retaining the us strength and durability. This rement has not been achieved without onal expense, as the best hickory and steel are now used, while formerly iron and inferior hickory and ash, which, though both strong and durable, nevertheless had such a bulk and weight as materially added to the draught and clumsiness of the vehicles.

Our American cousins were the first to understand and carry out this improvement, soon to be followed by English makers. Those shewn by the latter at the Avenue in the Agricultural Hall, Islington, at the Smithfield Club Show, would well bear comparison with others manufactured in any part or by any maker in the world.

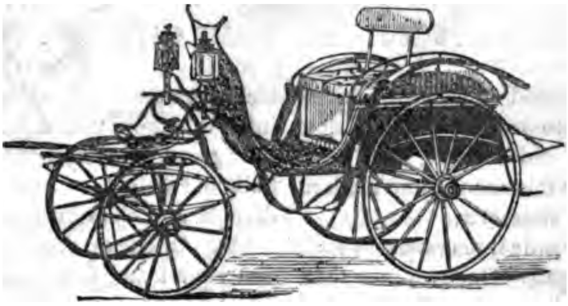
Among the carriages exhibited at the Hall we noted those of C. S. Windover, London, who shewed his prize waggonette or Stanhope Phaeton, of which we give an engraving. This has the advantage of being easily converted into a T cart, and also if required into a close carriage, by attaching a moveable top equally suitable for night drives or parties, &c. Hitherto, the great desideratum in this class of vehicle has been the difficulty of getting conveniently into the front seat; even when having to enter the back part of the machine, in the absence of assistance, the step had to be lowered, and on entering had again to be adjusted. In both cases Mr Windover has overcome the difficulty—in the former by a concealed step which, after being drawn out, hangs over the wheel, thus rendering the ascent easy; and in the latter by a simple and effective connexion between the door and step, both opening and closing together. Mr Windover also shewed one of his famous Parisian phaetons with moveable top, suitable for any climate. It is fitted up internally in morocco and cloth, and finished off in the most fashionable style. It is under duty, weighing less than 4 cwt.



Windover's Stanhope Phaeton or Waggonette.

Another prominent exhibitor in the Avenue was Mr J. B. Ashyford, of the Britannia Works, Fulham, who shewed, among other machines, his famous village phaeton, of which we have the pleasure of giving an illustration. Our contemporary, the *Times*, in a few lines so thoroughly explains all about the village phaeton, that we quote it.

"The village phaeton is a truly ingenious machine, it combines the shape and utility of the dog cart with the elegance of a park phaeton, is capable of carrying four persons and ample amount of luggage, it can be drawn by one cob or ordinary ponies, is light and convenient. We can recommend the pretty little village phaeton."



Ashyford's Village Phaeton.

We believe that upwards of 300 of this little machine have been sold. Mr Ashyford also exhibited his patent adjusting dog-cart, which attracted considerable attention. Although well known under the old form of adjustment, this dog-cart now commands increased notice from the simplicity of the plan adopted for balancing the carriage body.

Agricultural Engineering.

THE ANGLO-AMERICAN POTATO-DIGGER.

ESSRS COLEMAN & MORTON have purchased the American patent ɔtato-digger, which bids fair to excel .t is at present in the market. There ›ot in cultivation which is so universally ɜd by all classes of society as the roduced by one of our old *freebooters* potato. Cobbett hated it with a per- .tred, but it survived his curses, and ıted his Indian corn, or rather, we say it was so much regarded that his corn never gained a footing; but uite within the bounds of probability may yet do so in this country. After ırful potato blight, some quarter of a ɾ ago, which caused such famine in l, but was the means of abolishing the ıws in this country, potatoes were upon somewhat askance by farmers. ɜir intrinsic merits again asserted them- ʂpeedily, and they are now one of the ıaying growths on free-soil farms. ıing, therefore, tending to lessen labour nexion with them, is of great importance to farmers of all classes, as there are few farms upon which potatoes are not grown.

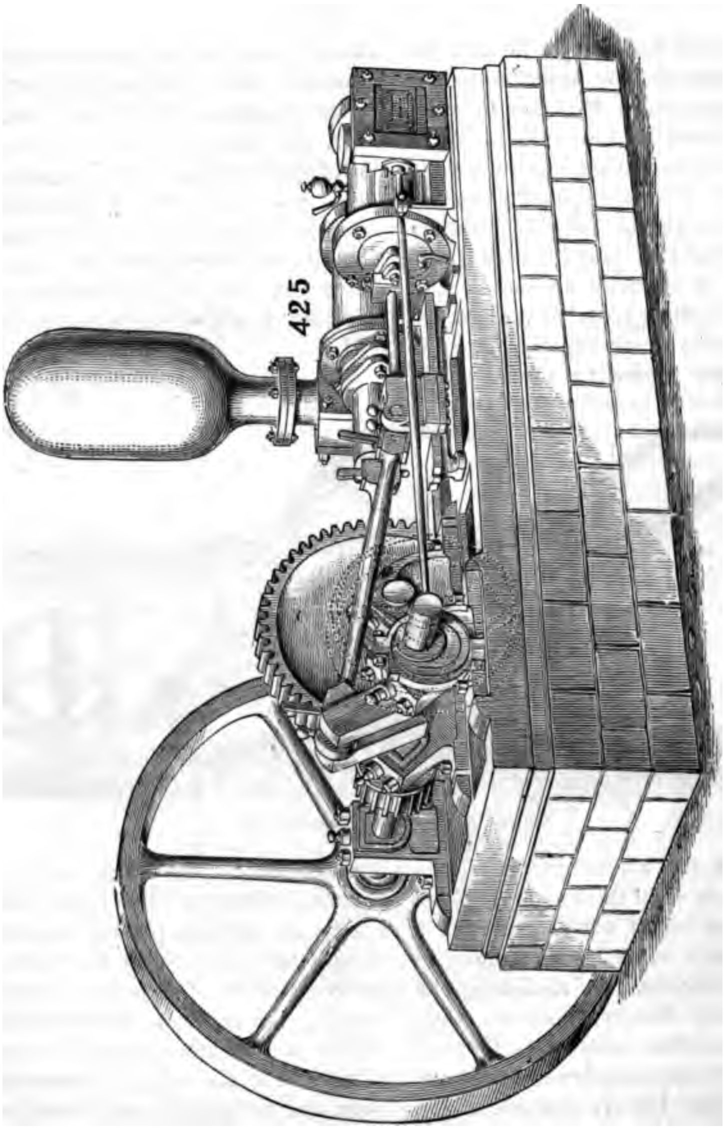
The Anglo-An Potato- er.

Potato-diggers we have had before us for years, and many of them, as previously reported in the pages of this Magazine, have done their work very satisfactorily. The latest invention is the one we figure. We have not had the opportunity of seeing it in action, but from its construction we should fancy that it will be competent to do its work well.

The engraving shews that the front double breasted share opens up the ridge or drill of potatoes, throwing the earth, roots, &c., against the two side breasts or mouldboards, which return them on the inner surface of the revolving riddle, the fingers of which (after allowing the earth to escape through them), deliver the potatoes upon the ground on either side of the ridge. The action is complete, and its draught, we are told, much less than that of Hansom's potato-digger (also manufactured by Messrs Coleman & Morton), and its price lower.

EVANS' STEAM PUMPING ENGINE.

THE accompanying engraving represents a steam pumping engine of 6 nominal horse-power, designed to fulfil two very important requirements in one machine, the raising of a good supply of water, and what, now-a-days, has become almost a necessit town or country—steam motive power.

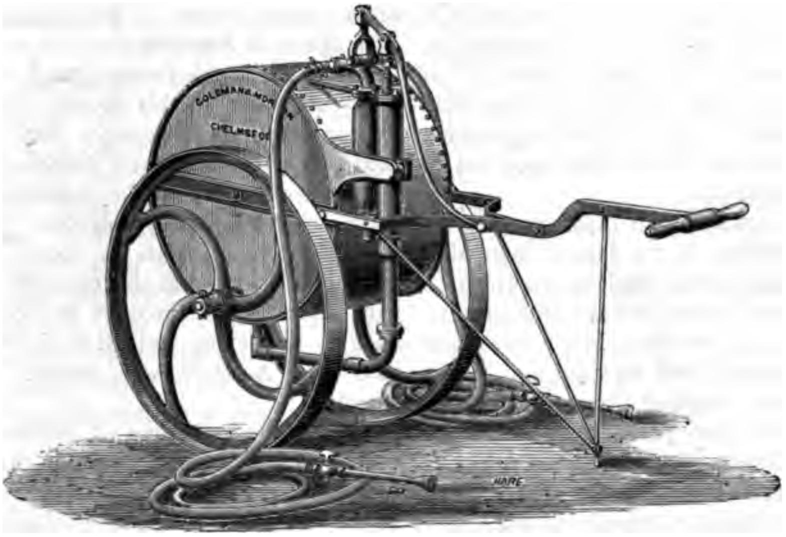


Evans' Steam Pumping Engine.

The machine we illustrate is, in ev respect, well adapted for supplying pu institutions, farms, gardens, &c., with wa t is, at the same time, available for the rous purposes to which an ordinary steam e is applied, such as sawing, thrashing, ing, &c. The engine being attached by l gearing to the pumps, the former may 'orked with or without the latter, by ecting or disconnecting the pinion wheel. e pump, which is placed beside the cylinder, is a double acting one, with s. It will pump clear or dirty water, is itted for the distribution of liquid man- nd in case of fire in the stack-yard or homestead, can throw a stream of water equal to a steam fire engine. It is very compact and simple in its arrangements, its wearing parts being easily moved and replaced by an unskilled attendant. We had the pleasure of examining one of these machines at the Wolverhampton show of the Royal, on the stand of Messrs J. Evans & Sons of that town. It attracted considerable attention there. Its simplicity, and the various uses to which it can be applied, induce us to bring it under the notice of our readers.

HOP SYRINGING MACHINE.

NE of the greatest enemies of the hop plant is the Aphis blight, more ionly called "Plant Lice," to destroy many plans resorted to by growers, been unsuccessful. The most effectual yet adopted for the purpose of obviat- e blight, is to wash the bine with water oft soap, and should this be applied at oper time, and judiciously performed, antations are, in a very short time, freed from the destructive pests. To assist as much as possible in securing the best machine for applying the mixture, the Royal Agricultural Society of England, in November 1870, offered a prize for "the best machine for washing the hop-plant to remove the aphis blight," which brought forward several machines to compete at Wolverhampton. As we announced at the time, the prize was awarded to that exhibited by Messrs Cole-



Hop Syringing Machine.

man & Morton, of Chelmsford, by whose kindness we are enabled to give the accompanying illustration. The machine, it will be observed, is composed of a cylindrical barrel, holding 35 gallons of water, mounted on two high wheels. A pump is attached to an outside projecting arm, so as to be easily removed if necessary, and, by means of it and the hose connected with it, the whole place is readily commanded. The judges of the hop machinery report, in the pages of the Society's *Journal*, that "the superiority of this machine over the others competing consists in its lighter draught in deep pulverized soil, on account of its larger wheels, 32 inches in diameter, and the distance of the water tank from the ground; in its remarkably easy working pump, whose capacious air vessel causes it to work light, and at the same time gives it great propelling power. This pump is placed on the left side, convenient for working and for purposes of repair, in these respects contrasting favourably with the other washing machines, whose pumps worked very hard, and, being in the centre of the tank, were difficult to get at. A brass strainer is screwed over the inlet of the pump, which is a great improvement."

AGRICULTURAL IMPLEMENTS AT THE ANTIPODES.

PARENTS, as a rule, are well pleased to hear of the successful progress of their children in things physical as well as mental; and a mother country should certainly exult in the advancement of her dependencies in all the arts and sciences which conduce to their prosperity. In this respect, Great Britain may well be proud of her Australian colonies, which, year after year, are making rapid progress both in manufactures and in agricultural pursuits.

A strong proof of the rapid progress of this great colony is the largely increasing demand for agricultural implements, which we always find to go hand in hand with successful farming. At one time almost the whole wants of Australia and New Zealand, in this respect, were supplied from the mother country; and even yet large quantities of machinery are exported by our principal manufacturers. We now learn that a great many manufactories of agricultural machinery have sprung up in Melbourne, and other places throughout the colony. Reaping machines, both manual and self-delivery, mowers, chaff-cutters, horse-rakes, ploughs, &c., of improved forms and fair workmanship, are turned out at these manufactories; and in addition to these, as we have before stated, Messrs Clayton & Shuttleworth, Howards, Hornsby, Samuelson, Gray, Murray, Sellar, and many other manufacturers of this country, have each agents in Australia.

Before the double-furrow plough was generally recognized in this country as a great improvement, its advantages were appreciated in the colonies, and numerous orders were received here by the manufacturers of these machines for exportation. With improved machines, such as these, and the many others sent from this country, together with those manufactured in the colony, we have no doubt that agriculture in New Zealand and Australia will receive a great stimulus.

There is, however, one art, indirectly connected with farming, where our Australian friends are certainly behind, viz., engraving. If the woodcuts of reaping machines, chaff-cutters, horse-rakes, &c., which appear in the advertising columns of the *Leader*, are fair specimens of the general state of the art of engraving, the sooner improvements are effected the better.

The Farm.

PORT AND EXPORT OF AGRICULTURAL COMMODITIES.

a note prefaced to the Returns, the
:ompilers tell us, and the explanation
unnecessary, that

> nport account for the present month will be
> many cases to exhibit a considerable deficiency
> :ompared with the month of December in pre-
> ears. This circumstance should not be taken
> :ate a decrease in the trade of the month, in-
> ı as in former years the account for December
> ›t published until the end of the following
> .ry, and embraced the record of large quantities
> ls imported in previous months, but not regis-
> ıntil the "Landing Accounts" had been re-
>
> The note appended to the account for the
> of January of last year pointed out the change
> ıd taken place in the system of registration;
> ect of the alteration will be seen in the fact
> .e figures for the present month of December,
> l of being unduly increased by including quanti-
> naining over from previous months, shew only
> ;itimate trade of the month.

usual, we begin with the importation of
ınimals from abroad. The number of
ıls is larger than usual, although, on the
of the Returns, the fact we mention
l not appear to be borne out. Before
new arrangement — upon which the
rnment must be congratulated—oxen,
and cows were all classed together;
the cows have a separate heading, and
numbers swell up the aggregate to a
er total than in 1870.

1870, the number of oxen and bulls re-
d was 145,737; in 1869, it was 167,577;
n 1871 we can only tell of oxen and
to the number of 135,133. But when
ıke oxen, bulls, and cows together, we
r the year which has just passed, 208,772
ıls; for 1870, 170,647; for 1869,
·74; so that we have really had up-
; of 38,000 head of cattle more than
'ear. Sheep we received in much larger
ıities than in any year embraced in the Returns. The number we got in the course of the year reached well on to a million—916,799. Calves we imported to the extent of 40,139—8614 more than in 1870, and 10,623 more than in 1869. The cost of this live meat reached £5,662,222; and with bacon the sum came up to £8,169,692. For beef salted, or slightly so, we disbursed £635,921; for hams, £195,325; and for meat otherwise unenumerated, £774,427, of which all but £100,000 was expended upon preserved meat. For pork, salted and fresh, we paid, £697,042; for poultry and game, £176,080, therefore for meat alone we paid £10,648,487, and were eggs included, as they ought to be, seeing they are the produce of farm stock, the cost of which was £1,265,484, the total would amount to £11,913,971—a sum which certainly, under more careful cultivation, should not go out of this country. The time will come, we believe, when we shall pay less in proportion to the population than we now do for meat alone.

Then the dairy produce cost us this year much more than in former ones, the expenditure for butter and cheese being no less than £10,302,535. With our climatic conditions so suitable for the rearing of dairy stock, a portion of this, we think, ought to remain in our own pockets.

The supplies of wheat from abroad were much larger this year than last. We received about 8,500,000 cwt. more, and paid for it about £7,000,000 sterling in excess of what we did in 1870. Barley, oats, beans, and Indian corn were also in greater demand, but there was a shorter supply of peas. The cost of these commodities, independent of wheat, was, in all, £15,608,949. In addition, we paid for wheat meal and flour £3,438,284, upwards of £50,000 more than ve expended last year, although we received ess quantity by 800,000 cwt.

The following tables shew the quantities, he countries whence the commodities were eceived, and their values, for the year that has ust closed, in comparison with 1870:—

QUANTITIES.

Wheat.	Year Ended Dec. 31, 1870. Cwt.	Year Ended Dec. 31, 1871. Cwt.
Russia	10,269,198	15,629,435
Denmark	327,919	130,370
Germany	3,348,214	3,049,031
France	258,644	134,841
Austrian Territories	60,472	239,147
Turkey, Wallachia, and Moldavia	489,421	1,418,886
Egypt	104,950	884,396
United States	12,371,922	13,405,057
Chili	599,337	549,529
British North America	2,838,361	3,279,264
Other Countries	237,791	687,690
Total	30,901,229	39,407,646

VALUE.

Russia	£5,117,392	£8,940,597
Denmark	165,301	77,791
Germany	1,949,805	2,018,292
France	140,119	72,345
Austrian Territories	29,071	158,475
Turkey, Wallachia, and Moldavia	223,104	737,718
Egypt	45,239	489,741
United States	6,564,341	8,062,414
Chili	360,841	358,427
British North America	1,537,855	2,005,698
Other Countries	130,959	424,132
Total	£16,264,027	£23,345,630

QUANTITIES.

	Year Ended Dec. 31, 1870. Cwt.	Year Ended Dec. 31, 1871. Cwt.
Barley	7,217,327	8,589,059
Oats	10,830,630	11,007,106
Peas	1,799,354	1,021,950
Beans	1,505,798	2,975,651
Indian corn	16,756,783	16,832,499

VALUE.

Barley	£2,831,844	£3,407,425
Oats	4,381,607	4,001,687
Peas	751,192	459,624
Beans	648,755	1,269,424
Indian corn	5,790,550	6,470,789

QUANTITIES.

Wheat Meal and Flour.	Year Ended Dec. 31, 1870. Cwt.	Year Ended Dec. 31, 1871. Cwt.
Germany	911,108	967,892
France	645,181	37,150
United States	2,148,251	1,794,805
British North America	451,463	403,989
Other Countries	647,906	780,802
Total	4,803,909	3,984,638

VALUE.

Germany	£653,463	£914,275
France	467,071	32,950
United States	1,450,430	1,397,326
British North America	326,597	317,862
Other Countries	486,190	775,871
Total	£3,383,651	£3,438,284

The supply of guano was very small during the month, only 4560 tons to compare with 41,265 in the December of the previous year; and the quantity we received in the twelve months was also much less—only 178,678 tons, as against 280,311 tons up to the end of last year. The amount we paid for this fertilizer was £1,994,145, to compare with £3,476,680 in 1870. The imports of bones have been smaller on the month; but larger, by 2000 tons, in the twelve; but the money we expended, however, remained about the same, being, in round numbers, £591,000. Nitrate of soda was in greater demand.

Regarding feeding stuffs, it may be noted that oil seed cake has considerably increased during the year, and that on cotton-seed there is a marked increase. The same is to be noted of rape.

Wool has been reaching us in large quantities, as the following tables will shew. We give the values also:—

QUANTITIES.

Wool, Sheep, and Lambs.	Year Ended Dec. 31, 1870. lb.	Year Ended Dec. 31, 1871. lb.
From Countries in Europe	23,686,039	54,276,417
,, British Possessions in South Africa	32,785,271	32,643,785
,, British India	11,143,148	19,494,009
,, Australia	175,081,427	182,753,585
,, Other Countries	16,666,078	30,343,540
Total	259,361,963	319,511,336

VALUE.

From Countries in Europe	£1,256,157	£3,000,602
,, British Possessions in South Africa ...	2,085,625	1,744,952
,, British India	345,356	697,523
,, Australia	11,136,138	10,846,342
,, Other Countries......	534,343	1,147,387
Total	£15,357,619	£17,436,806

There is a decrease in the quantity of home made butter exported, and the same remark applies to cheese.

The export of horses have fallen much off during the December month, but owing to the demand for France, there has been an increase on the year.

Thanks to Germany and Belgium, we increased our exports of home-grown wool last season nearly 3,000,000 lb. The tables annexed shew the quantities and values.

QUANTITIES.

	Year Ended Dec. 31, 1870.	Year Ended Dec. 31, 1871.
Wool, Sheep, and Lambs.	lb.	lb.
To Germany	1,286,598	2,156,420
,, Belgium	1,056,869	2,863,438
,, France...............	3,075,651	2,767,306
,, United States	2,558,716	2,423,258
,, Other Countries ...	1,123,571	1,758,391
Total	9,101,405	11,968,813

VALUE.

To Germany	£92,959	£151,779
,, Belgium	71,695	187,531
,, France...............	208,433	213,126
,, United States	130,396	136,735
,, Other Countries ...	77,087	135,353
Total	£580,570	£824,524

TURNIP GROWING AND MANURING IN ABERDEENSHIRE.

FOR nearly twenty years there has been, in the Garioch district of Aberdeenshire, a turnip growing-club, which has annually supplied us with valuable information regarding the cultivation of this now indispensable root in the husbandry of this country. The Highland Society encourages the members in their laudable experiments by the offer of silver medals for swedish and green-topped yellow, and all other common turnips; and money prizes are also awarded. The judges, Messrs James Milne, John Annand, and John Tait, have just completed their inspection for this season, and have made their awards for the respective varieties, which are as follow :—

Swedish—1st Prize, the Highland Society's silver medal, Mr John Tait, Crichie; 2d and 3d money Prizes—Messrs J. Philip, Boynds; and John Annand, Upper Boat. *Green-topped Yellow, and all other common Turnips*—1st Prize, the Highland Society's silver medal—Mr William Philip, Lofthillock; 2d and 3d money Prizes — Messrs William Bisset, Artannes; and John Tait, Crichie.

Attached to these awards we have a report made by the three judges, from which it appears that the average yield of swedes per acre this year was 21 tons 12 cwt. 3 qr., about 1½ ton less than in 1870, when they weighed 23 tons 1 cwt. 1 qr. But while swedes thus shew a deficiency, an excess, to the extent of 16 cwt., is noted in green-topped yellow, the quantity lifted reaching an average this year of 18 tons 1 cwt. 2 qr., to compare with 17 tons 5 cwt. 1 qr., in 1870. During September and October, it was the general opinion that the crop would be much more abundant than it had been for some years, but the genial weather then experienced failed to overcome the baneful effects of the June drought upon the plant, and the rather injurious heavy falls of rain, and flooding in the succeeding month.

Finger-and-toe, prevalent in many parts of the county, we are glad to learn, prevails to only a very limited extent in the district embraced within the operations of this association. Owing to the failure of swedes in the early part of the season, and the consequent necessity for re-sowing with other varieties, the acreage under swedish this year was less than average. The reporters go on to remark, and the observations are worthy of all consideration, that "Sowing of swedish turnips after Whitsunday has scarcely ever been found to give a remunerative yield. There were 119 tests made, but only the average of each field is mentioned in the list, and, we rest assured, pretty accurate results have been arrived at. Artificial manures form a heavy item in the cost of production. The whole season being generally required for maturing the roots, whatever may be the ultimate value of those manures, that which gives the earliest start to the plant ought to merit attention."

We have often thought farmers were too dilatory in getting their turnip seed into the ground, just as they are often culpably negligent in taking the bulbs out of the drills, and we are glad to see our views on the first point confirmed by such good authorities.

The judges give us some particulars of the fields they examined, with the kinds of manure applied. It would have been interesting had they told the date of sowing. They say :—

> Taking swedes first, we find the weight per acre in fields examined to range from 15 tons 5 cwt. 2 qr. to 27 tons 11 cwt., this latter weight having been grown on Boynds (green-topped swedes). The field measured 12¾ acres, and the manure used per acre 18 yards farm-yard dung, 5 bushels mixed bones, and 2½ cwt. super-phosphate. The next heaviest field is on Crichie—same variety of turnip, 8 acres in field—manure, 17 yards farm-yard dung, 1 cwt. guano, and 3 cwt. dissolved bones. The weight in this field was 26 tons 17 cwt. 1 qr. One point of difference was that the drills were 1 inch wider than in the Boynds field, the measurement being 25¾ inches and 26¾ inches respectively. Another field on Crichie, treated in precisely the same way, but with 2 yards less per acre of dung, yielded a crop of 24 tons 8 cwt. 2 qr. per acre. Coming to the green-topped yellow and other common varieties, we find the weights per acre ranging from 12 tons 8 cwt. 2 qr. to 27 tons 19 cwt. 3 qr., the latter crop being grown on a field of 4 acres on Boynds—manure, 12 yards farm-yard dung, and 1½ cwt. of Burrell's Challenge manure. The next heaviest crop is on Lofthillock—extent of field 9 acres—manure, 18 yards farm-yard dung, 2½ cwt. super-phosphate, and 1½ cwt. "garleolege" per acre—the weight here is 24 tons 8 cwt. 2 qr. per acre. Both in this case and at Boynds the variety of turnip grown is green-top yellow. A field of 20 acres on West Balhaggardy yields 22 ton per acre (all green-top yellows), and here the manure is 13 yards farm-yard dung, 8 bushels mixed bones, and 1½ cwt. Miller's manure, per acre.

Appended are tables giving the average weights of roots and cost of manures for the last fifteen years :—

SWEDISH TURNIPS.

Year.	Average Weight.			Average Cost of Manure.		
	T.	C.	Q.	£	s.	d.
1857	21	14	3	4	18	1
1858	21	1	0	4	10	5
1859	11	10	3	4	6	9
1860	21	19	3	4	12	3
1861	26	13	3	4	16	3
1862	19	7	2	4	18	5
1863	21	14	3	4	14	4
1864	21	17	2	4	15	0
1865	20	7	0	4	17	8
1866	24	2	2	4	11	11
1867	17	18	0	4	14	7
1868	17	19	2	4	12	5
1869	22	18	2	4	15	9
1870	23	1	1	5	2	11
1871	21	12	2	5	2	3

GREEN-TOPPED YELLOW AND OTHER TURNIPS.

Year.	Average Weight.			Average Cost of Manure.		
	T.	C.	Q.	£	s.	d.
1857	16	7	1	4	12	2
1858	18	14	2	4	6	1
1859	13	7	2	4	6	9
1860	20	9	3	4	5	11
1861	20	6	2	4	9	3
1862	18	14	2	4	7	4
1863	——			——		
1864	20	9	0	4	12	3
1865	18	1	0	4	15	9
1866	23	7	0	4	4	2
1867	16	5	0	4	5	8
1868	14	7	2	4	6	2
1869	21	10	3	4	12	3
1870	17	5	1	4	17	7
1871	18	1	2	4	16	0

A great amount of good might, we think result to turnip husbandry were the practice of the Garioch Club followed more generally than it is, by other associations.

THE STORING OF TURNIPS.

E present is an opportune time to impress upon farmers the neccessity in the storing of turnips. Past years nce should teach them that without and careful handling, the crop loses in quality, and it is often rendered useless by careful storing after the re gathered. We give the following bearing on the subject, which was read Aitchison, Winingtonrig, at a recent g of the West Teviotdale Farmers' —

re is probably no branch of farm ement that has been more neglected e storing of the turnip crop from the s of the winter frost. From the Govern- statistics for 1870, it appeared there 98,544 acres under turnips in Scotland, is nearly one-ninth of the land under tion. It is absolutely necessary that terprise the farmer displays should not n end when the turnip crops comes to ty. It is not so when grain crops are they are secured from the grasp of as rapidly as possible. It is true, grain e liable to injury by rain or snow than s. But if the experience of the past nters does not convince farmers that s are liable to suffer damage by expo- the frosts, it would be a hopeless task vince them in any other way. The of 1869 and 1870 inflicted very heavy on the farmers, the frost coming on in both seasons before a supply of tur- could be secured on every farm. It ued till some time in February, with severity that from the want of snow on ound more than two-thirds of the root ll over this country was, in the middle ruary, rendered useless. The quality bulbs was very much injured more than nth before that, making a moderate nce for the early destruction by frost ermin. The total loss on turnips in Scotland could not be less than £1,000,000 sterling. Last winter, matters were little better. Farmers had a little more time in the autumn to store turnips, and from various causes the proportion was very small. In some districts there was a thin coating of snow on the ground during the intense frost, and this saved the bulbs a little. Still, the loss this year was in some counties heavier than the last, and we may say that nearly another £1,000,000 was lost in 1870-71 in consequence of the ravages of the frost.

There is no doubt that farmers must suffer first from such losses, and then the nation. A remedy must be provided when we lose crop after crop raised at such expense. But when the turnips are not available in the spring, farmers have to resort to artificial feeding to carry their cattle forward to the grass, and have to spend a large amount of money on cake to maintain their store cattle, which the turnips would do were they all saved. Further evidence is not wanted to bring the fact home to every farmer, that the turnip crop cannot stand the winter frost unless he successfully strive to preserve it. In regard to the storing of turnips for winter use, as a very little frost is prejudicial to them when stored up into heaps, more particularly when they get frost after they are topped and tailed and lying in the ridges, —the sure way is to carry them from the field immediately. In topping them, do not cut the skin of the turnip either on the top or tail, as a turnip of which the skin is broken always rots first. There is a mode of storing turnips for winter use, of which I think we will all have had some experience. After they are topped and tailed, they are thrown into small pits and covered up with clay. They keep very well in these pits, but if you have to go to the field in wet weather, you injure the land very much, and, at the same time, they come out very dirty.

They must be washed before you can give them to cattle. I do not think this mode will preserve them from frost altogether, for I have gone to these pits on a hard frost and could not get a turnip that cattle could eat. The turnips were all hard frozen. Another way is carting them off the field and putting them into long rows, about 6 feet at the bottom, tapering to a top. These pits must have a great quantity of straw put on them. It is almost impossible to keep out frost by storing them in this form, and in a high situation the spring winds wither them very much; so they must lose a considerable portion of their feeding qualities. The mode that I would recommend for winter use, is to cart the turnips off the land and put them into large heaps, something like the shape of a dunghill, about 3 feet in depth, covered well with straw, and some rank horse-dung taken from the stable and put round the sides of the heap. I think turnips will retain more of the feeding qualities if stored in this way than by any other of the two modes mentioned.

Next, as to the best mode of storing turnips for both sheep and cattle for spring use. When you enter the field you must make room for your horse and plough—you must pull one row and throw it to a side. Then you take a single plough and go along the side of the growing row, and lay out an ordinary furrow. Then you must have five or six labourers set at equal distances from each other; they pull two rows and set them into the furrow that is made. You next go down with the plough and turn back the furrow that was put out in coming up on to the top of the turnips. On level-lying fields they may be covered both up and down; it answers much better when they are ploughed up. It saves time. A man with a pair of horses and six labourers will level 3 acres per day. This is a more speedy system than topping and tailing; and it has another advantage, that it can be accomplished without any serious consequences, and answers well when the turnips are too wet for storing otherwise. When you plough the turnips up in the spring to the sheep or cattle, you will find that the roots have lost none of their feeding qualities; they are as good as when they were put down. Some will have this objection—how are the turnips eaten off on wet land in wet weather? Well, I think this will be easily overcome. If you have a lot of sheep of twenty or twenty-five score, give them a break of eight or nine acres, then plough up one row and leave two over all the break; when they are well eaten up, open one row and leave one, and so on. You will find that the sheep do very well, and the land is not much injured. If the spring happens to be an early one, and the turnips running to seed, you can give your sheep all the field, and plough the rows up as they are required. I have been of opinion, when we ploughed up the crop in the spring, that it was a much weightier crop than when covered up; so I made a trial in November last. I selected nine swede turnips 19 inches in circumference, and covered them up the same way, putting up a mark; and when I ploughed them up in the month of April, two of the turnips measured 20½ inches, and the remaining seven fully 20 inches. I think this covering system should be commenced before the frost sets in, and even before the turnips arrive at full maturity.

FARMING IN EAST LOTHIAN.

r.—CULTIVATION OF THE MIDDLE AND NORTHERN DISTRICTS.

E have alluded in previous articles to the excellence of the management home farm of Yester, on the estate of arquis of Tweeddale.

the middle district we take the home of Whittinghame, the cultivation of reflects credit on Mr Smith, the factor. now come to the northern portion of ounty. The principal proprietors are, Mary Nesbit Hamilton, the Earl of lington, Sir Hew Dalrymple, Mr Hope, ıffness, Sir George Suttie, Sir David , and the Earl of Wemyss.

sford House, the family seat of the of Wemyss, beautifully situated in a bay ed by the Firth of Forth, is one of the ng features of this part of the shire. In ontinuous chain along the coast (all on estate) are the farms of Longniddry, Mains, Seton, and Craigielaw.

rther along the coast we have Luffness se, the family mansion of the Hopes. farms on this estate include Luffness ıs, Saltcoats (where there is a fine old , West Fortune, Aberlady Mains, Brown- and Waughton.

e come next to the village of Gullane, a large common attached. This village, ormer days, before railways made the it of race-horses so easy, might be called Newmarket of Scotland. A few "platers" still be seen taking exercise on the hill, the days of Lanercost, the Era, and nticleer, have passed away.

his may be said to join on with Archer- estate, Mr R. C. N. Hamilton's, which he most beautiful village and gardens in land upon it, viz., the village of Dirleton, its gardens in front of the houses, and its d green, the scene of many a pleasant nic. The mansion—Archerfield House ommands a fine view of the Forth. The farms on this estate are very valuable. There are, for instance, those of Queenston Bank, West Fenton, Fenton Barns, East Fenton, Castle Mains, Ferrygate, Williamstone, New House, and Highfield. On some of these farms, the very perfection of husbandry is practised.

Passing the Royal Burgh of North Berwick, rapidly growing into a large and fashionable watering place, we come to the estate of Sir Hew Dalrymple. The principal farms lie all round the base of North Berwick Law; and, for quality of soil, may be taken as a whole to be considered the best in the county. North Berwick Mains, The Abbey, Rhodes, Castleton, Black Dykes, Gleghornie, The Heugh, Bonnington, are among the farms where farming is just as it should be—for profit.

Sir George Suttie, proprietor of Balgone, has some fine land on his estate. Sir George is one of the few proprietors who farms largely on his own account. This he does on Preston Grange estate, in the western district of East Lothian.

Newbythe—the seat of Sir David Baird, has some good land attached to it, including the farms of Stonelaws, Whitekirk, and New Mains—all of fine quality of soil. Mention has been made of all the large estates, but we cannot pass Seacliff, the property of Mr Laidlay. It lies within a ¼ mile of Tantallon Castle, with perhaps the finest view of the Firth we have; and is, in all relations to marine and inland scenery, very nearly perfect. The farms of Scoughall and Auldhame, on this property, *may* be equalled, but there are none better.

We now come to Lord Haddington's estate of Tyninghame. East Lothian has been described as comparatively a treeless shire. But admitting, to some extent, the truth of this, where will any one find more noble trees than are to be seen in Binning Woods, whose forest glades impart a charm to those who possess less agricultural enthusiasm than ourselves, and forbids the remark we have sometimes heard:—"Why, your county is neither more or less than a succession of 'kail yards.'" [Cottage gardens.] The noble woods are admirably adapted for shelter, and the grazing of the parks is very valuable. Lord Haddington has annually a sale of fat stock—principally West Highland bullocks, which are wintered and fed off next year; shorthorns, and Cheviot, and blackfaced sheep. Shorthorns were sold this year at prices verging on £40; West Highlanders, £23; Cheviot sheep, 70s.; blackfaced, 60s. The description of soil is very good, and has been long in high cultivation. The farms of Lawhead, Knowes, Kirkland Hill, Hedderwick, Broomhouse, and others, all establish the high character of the estate.

Near Dunbar we have Sir George Warrender's lands—the Lochend estate. The nature of this soil is peculiarly favourable for potato growing, as it has the peculiar red tinge known in the southern markets as Dunbar red soil. These potatoes always command 10s. per ton more than the best quality of "grey soils." This alone gives a very great increase to the value of the land. On the farm of Newton-Lees, within 1 mile or so of Dunbar, potatoes were sold at something over £50 per imperial acre this autumn.

One of the *crack* farms of this district, East Barnes, the property of Mr Mitchell Innes, and farmed by Mr Murray, is a fine illustration of a good agricultural holding, under first-rate management. Some years ago, in a season of average character, the wheat crops over the whole of this farm were above 64 bushels per acre. The farms of Thornton Loch, and Skateraw, and Innerwick, are also well farmed.

On the Biel estate — another of Lady Mary Nesbit Hamilton's properties—are amongst the best in the county. Mr Hunter, of Thurston, farms largely on his own account. He is thoroughly practical, and goes *on amore* into every particular. His lands are all well farmed. It is not necessary, in regard to all the remarks we may have to make, to adhere to the districts into which we have divided the county for the purposes of illustration, but shall hereafter, in treating of all matters regarding its system of agriculture, speak of the whole in the more interesting form of a narrative, having reference generally to the whole of the shire. We will give, in our next, the agricultural statistics of the county.

NO. V.—STATISTICS—ARTIFICIAL MANURES—STEAM CULTIVATION.

To illustrate the cultivation of East Lothian, we give the following Returns of produce published by the Board of Trade:—The total acreage under all kinds of crops, including bare fallow and grass, is 107,420, of which wheat forms 12,761; barley, 13,830; oats, 16,010; rye, 37; beans, 1718; peas, 130. Total under corn crops, 44,486—under green crops, 25,871; clover grasses, under rotation, 23,817; permanent pasture not under rotation and not mountain land, 12,660. Per-centage of corn crops to total acreage under all kinds of crops 41.4. *Number of farmers in the county.*—There are 569 occupiers of land, the average extent held by each being 192 acres or thereby. The population of the county is 38,666. The number of horses employed in agriculture is about 4200; of feeding cattle 8000, but this number varies much according to the turnip crop. The statistics of this year will probably shew a return of 10,000. The number of sheep fed in the county depends entirely on the turnip crop, and varies from 9000 to 13,000; of pigs about 3000. The returns of the green crops are—Turnips, 16,000 acres; potatoes, 9000; mangold, 43; carrots, 170; cabbage, kohl rabi, and rape, 150.

ARTIFICIAL MANURES.

We have no Board of Trade Returns to enable us, with perfect accuracy, to give the quantity of artificial manure used in East Lothian every year. The tonnage we cannot estimate, but the money paid is upwards of £150,000. Here we cannot avoid saying how valuable it would be to have accurat

s of the quantities and kinds of arti-
anures applied to the soil of the
Kingdom every year. From experi-
e know that adulteration is practised
enormous extent, especially in the
cture of superphosphates. But farmers
re swindled have, to a great extent,
lves to blame. In Scotland, we have
ighland and Agricultural Society to
t us. Dr Anderson, of Glasgow, the
ltural chemist of the Society, is always
ed, on the very shortest notice, to
e our manures. A practice we invari-
ollow, and a profitable one to adopt, is
o purchase manures on the understand-
at the vendors' guarantee will stand the
Professor Anderson's analyses. In past
the farmers of East Lothian, in fertilizing
il, confined themselves to the use of
of which there are ample supplies in the
y, also rape dust, and ground bones, and
ional shiploads of manure from Edin-
or Leith. Perhaps two agents would
ct the whole business of the county.
a-days, the names of the agents are
, and the catalogues of named manures,
erable. What the profits are we can-
ay; but some agents seem perfectly
ed when they have sold 2 tons. Query,
uch will they have to themselves from
? These remarks apply to those who
e termed the *leeches of agriculture*, who
insist upon somebody trying something
was never heard of previously. We
large and highly respected merchants,
nvite farmers to analyse their manures.
a safeguard to themselves. It may not
nerally known, but it is a fact we can
antiate from repeated experiments, that
me soils, a well manufactured coprolite-
phosphate, will grow a better crop than
phosphate made from the best bone
It was Dr Anderson who mentioned
ossibility of this, and we proved it by
l experiments repeated two seasons.
ers who do not wish to be imposed upon,
ho also require the cheapest and best
phosphate, should manufacture it themselves. Our practice is to buy a first class coprolite-superphosphate, and mix it in equal quantities with fine dry bone meal. It should lie three months before being used. Farmers as a rule are either careless or lazy, and do not protect themselves. Now a-days, the most distant counties can communicate in a few hours with Glasgow, and no one should grudge either the trouble or expense of analysis. The analytical account of the chemist will be found the most profitable one for the year.

THE STEAM-PLOUGH.

We mentioned the number of horses employed in agriculture. These have been diminished, to some extent, by the use of steam-ploughs. The steam-plough was first tried by Lord Tweeddale many years ago; but its use was discontinued until the enterprise of Mr Sadler brought a very perfect set of Mr Fowler's steam tackle to Ferrygate in 1862. A very short time after this, Mr Begbie, Queenstown Bank, purchased one of Mr Fowler's steam-ploughs. These farms, as we have previously mentioned, are both on the estate of Lady Mary Nesbit Hamilton. The introduction of steam culture on the Dirleton estate was celebrated by a banquet given by Mr Nesbit Hamilton, and at which he presided. Here we may state that, throwing aside the two great bugbears of dispute, viz., hypothec and the Game-laws, everything is done by our landlords to foster and encourage the enterprise of our farmers. We alluded, in the opening article, to the strong Protectionist feelings of many of our agriculturists. By a strange coincidence, Mr Cobden was at this banquet, and he was welcomed. Mr Hope, Fenton Barns, whose name is almost as well known as agriculture itself, introduced the next steam apparatus, viz., one of the Messrs Howard's, of Bedford. Mr Todd, Castlemains, shortly after purchased one of Fowler's. These farms are all adjoining, and any passing stranger might see four steam-ploughs at work within sight of each other.

NO. VI.—IS A STEAM-PLOUGH OF MUCH ADVANTAGE?

We have mentioned four steam-ploughs which could be seen working within sight of each other, and all on the same estate. Besides these, Mr Reid, Drem, on Lord Hopetoun's property, started a set of Mr Coleman's tackle. Mr Henderson, Longniddry, approves most of Mr Fowler's, a double-engine system, and purchased two of his ploughs, one for himself, the other for his son, who farms Markle, a farm previously referred to on the Gilmerton estate. Now we do not wish to advance or pourtray in too favourable terms the enterprise and pluck of our East Lothian farmers, but these steam-plough statistics prove there is no decadence of the agricultural spirit which made East Lothian stand almost alone in former days. We have numbers of the *Farmer's Journal* so far back as 1809, published weekly in London, in which the East Lothian monthly agricultural report stands promiment, and written in a style, its diction so easy and concise, it would be well to imitate at the present day.

In East Lothian the farms are mostly small, and the productive qualities of the soil very great, therefore, there is, comparatively with other districts, an extra amount of carting required, which *at present* can only be accomplished by horse labour, such as manuring stubble in autumn, or manuring in the drill in spring, delivering expeditiously a large quantity of potatoes, or, what is more important of all, to harvest the grain quickly. If a farm is large enough to employ, besides a steam-plough, a sufficient number of horses for these purposes, then we admit its advantage. No one can question the superiority of its work. The difficulty here is to utilize its powers properly. We have all fixed steam-engines with thrashing-mills attached, otherwise the steam-plough engine might have been used to thrash our crops. Mr Fowler's tackle involves a very heavy outlay, the interest of the money coming very little short of the saving of horse labour effected. We take a neighbouring farm for illustration, where six pairs of horses were formerly kept, and now with a steam-plough, four pairs are found sufficient. We count the annual cost of a pair of horses £105. The detailed items of this estimate we will give when we come to deal with the farm labour accounts. This shews, apparently, a saving of £210 per annum on a farm of about 450 acres. From this must be deducted the interest on the cost of the engine and gearing, and there is no saving in the number of men employed on the farm. We have also been told the steam-plough eats no oats, but we rather suspect she entails a pretty heavy doctor's bill—viz., the repairs of the engine will exceed the farrier's account, and would also pay for a dead horse occasionally. The advantage of the steam-plough is greatest to those who have an opportunity of hiring one. A system of doing this, Mr Sadler very kindly tried to introduce when at Ferrygate. He purchased a second set of Mr Fowler's tackle, and advertised the use of his plough. However, he found it most difficult to manage. Some farmers who enjoyed the full benefit of the plough one season, refusing to employ it the next, when labour was far advanced. Others, again, insisting upon having it first or refusing its use altogether. However advantageous to those who employed it, Mr Sadler found no personal benefit from hiring it out; but he acted as pioneer, both in regard to its introduction into our country, and also projected what will probably be its greatest benefit to our highly cultivated shires—viz., a system by which a steam-plough may be hired. If a properly organized plan were introduced, having, say a certain number of acres guaranteed from each farmer every year—the work to be done in the order most convenient for the engines travelling.

We cannot leave this part of our subject, without remarking upon the obligations many of us were under to Mr Sadler for the use of his plough, and trust that ere long a local or East Lothian steam-plough company may be started, which we have no doubt would eventually prove a great success. We may mention that Fisken's steam-plough apparatus was exhibited at Yester (Lord ldale's), lately—a full report of the trial een published.

REAPING MACHINES.

we are now treating of the improved :ments of husbandry, we take the reap achine next. In regard to its advantage raiue, there cannot be one dissentient . But have we not been slow to adopt However painful it may be to "fess," as y called it, we must confess to having garded the great invention of the Rev. ck Bell, whose reaping machine, : so long ago as 1828, was looked upon ly as a kind of agricultural toy at home; from across the Atlantic a reaping ine (M'Cormack's), which might be cterized as an American translation 3ell's, was brought and exhibited ie great Exhibition of 1851, which ed the eyes of our farmers in regard he possibility of reaping grain by inery. The first trial of a reaping ine — one of Bell's—was made at tassie, a very celebrated farm in East ian, the property of T. Mitchell Innes, We think it was in 1852 this exhibition place; nearly all our most eminent ers were present, and few then be- l in the possibility of its perfect success. Iope, Fenton Barns, was the first who ht a reaping machine, which he tried field of wheat in 1853. We remember Tweeddale was there, and other ent agriculturists from a distance. ı that day we may say that the problem ıping by machinery in East Lothian was d. Other counties rapidily followed suit. inventive genius of Great Britain was ap- to the subject, the great object being to n sufficient *strength in frame work, ned with lightness of construction and ısed rapidity in the action of the knives.* hew how universal is the adoption of ng machines in East Lothian, we give tables, one of the parishes with the ines used in each; also another with the s of the different makers. The machines of various construction, but all are mo- d, so far, after the invention of Mr Bell who may be called "the Watt" of the reaping machine. What Watt's genius did for the steam-engine, the genius of Bell did for the reaper.

	Machines used.
Aberlady,	21
Athelstaneford,	21
Bolton,	15
Dirleton,	34
Dunbar,	38
Fala and Soutra,	6
Garvald,	26
Gifford,	28
Gladsmuir,	46
Haddington,	62
Humbie,	34
Innerwick,	20
Morham,	10
North Berwick,	31
Oldhamstocks,	16
Ormiston,	22
Pencaitland,	26
Prestonkirk,	39
Prestonpans,	7
Salton,	26
Spott,	18
Stenton,	19
Tranent,	38
Whitekirk,	28
Whittingham,	25
Total,	656

	Machines.
Halliday,	133
Gardener & Lindsay,	85
Bamlett,	64
Porteous,	46
Brigham & Bickerton,	42
Hornsby & Sons,	42
Kemp, Murray, & Nicholson,	42
Bridges,	41
Samuelson,	28
Lillie, Goodlett, & Elder,	26
Picksley & Sim,	20
Jack & Son,	12
Sherriff,	11
Wallace & Son,	11
Wood & Son,	11
Bell's, by Croskill,	8
Scott,	5
Burgess & Key,	4
Croskill,	4
Munro & Dickson,	4
Wright, Seton,	3
Brown, Traprain,	2

Brown & Young, Cuthbert, Dray, Hunter, Milton, Moffat, M'Cormack, Sim, Stevenson, Walker, Winton, and Young—one each.

Total 656

In our next, after alluding to the thrashing-mills and double-furrow ploughs used in East-Lothian, we will give the rent of the land on different estates, with the various systems under which they are paid, and an explanation of what are called our "fiars' prices," under which system the greater portion of the rent of the land of East Lothian is regulated, and the stipends of the country clergy of the Church of Scotland are paid.

THE AGRICULTURE OF MORAYSHIRE.

We give the following abridgment of several articles on the above subject from the *Scotsman.*

In the course of the last twenty years, improvements in the shape of better house accommodation, fencing, draining arable lands, &c., have been more extensively carried on in Morayshire than the reclamation of waste land has been.

There has been a considerable change for the better in the cultivation of the soil since the abolition of the Corn-laws, some twenty-five years ago. The implements used in the tillage of the land have been immensely improved. To begin with the ploughs, there is probably not now a plough of wooden construction at work in the county, while less than half-a-century ago they were plentiful. During the last fifteen years substantial iron ploughs were the description commonly used on the farms. On a considerable number of holdings, however, the ploughs, though constructed of iron, are still of a rather rickety, primitive kind—more so than those used in Aberdeen and Banffshires. This is due to various circumstances. In the first place, much of the soil on plains being so light, sandy, and easy to turn over, an inferior plough will make quite good work on it; and, in the next place, the proportion of farmers' sons who work horses and plough in Morayshire is considerably less than in the other two counties. On many large farms the best of swing ploughs are, to all appearance, soon to be superseded by other appliances. Double-furrow ploughs, drawn, in some instances, by two, and generally by three horses, have done good service on the lighter soils for two or three years. The soil of Morayshire is well suited for this implement. For five years, Mr Yool, of Coulardbank and Westerfolds, has ploughed the greater portion of the arable land rented by him by means of steam, and during the last two or three years the cultivation has been most thorough and satisfactory. His is the stationary engine system. In the course of the last few weeks, circulars have been issued among the Morayshire farmers with the view of ascertaining to what extent a steam cultivation company would be supported or patronized. Considering the adaptability of much of the arable land in this county for such cultivation, there can be little doubt that a steam cultivation company will be formed in that part of the north at no distant day.

The improvement in the construction of carts, harrows, grubbers, drill-harrows, drill, ploughs, turnip-sowing machines, rollers, and many other implements used on the farm, is equally noticeable. There are very few farms of 100 acres and upwards on which the drill or broad-cast machine is not used, and fewer still which have not the benefits of the reaper.

The more common system of cropping is in accordance with the five-shift course. Some farm with six-shifts, and some with seven, but these form the minority. An opinion is gaining ground that a hard and fast line should not be laid down in the leases as to the course of cropping. This is done, of course, mainly to provide against over-cropping or exhaustion of the land by an unscrupulous tenant.

There is generally a large supply of excel-n-yard manure at the farmers' and this is extensively eked out in zing of the soil by artificial manures. low districts, the farms vary in size o 700 acres, a great many ranging to 500 acres each. The rents are reasonable, and while a commendified independence is manifested by rity of tenants towards the landlords, are, on the whole, attentive to the es of the farmer, and a tolerably ling exists between the parties. The of the lease is generally nineteen nd rents are paid half-yearly—at day and Martinmas.

milies of the farmers in Morayshire, ly stated, do much less of the farm n is the case in Banff and Aberdeen- Servants have thus to be hired tensively. They are lodged and fed in cottages on or near the farm, some es, and some in the farm kitchen. n cottages are the more comfortable, number of cottages is yearly increas-

rea returned as producing grain crops yshire in 1870, was 39,678 acres, as d with 34,747 acres in 1855. In the ar, however, it should be mentioned returns were made by tenants paying 10 of yearly rent, whereas, last year, es were issued by the Board of Trade ccupants of a ¼ of an acre and s, and in almost every case returns ade. The increase of the area under ops during the last sixteen years must e be considerably less than the 4931 presented by the above figures. In 298 acres were set down as growing and in 1870 only 5376 acres. The e of wheat growing is traceable to the at for several years prices have not high as they were some twelve or fif- ars ago, while barley has recently been ly dearer. The most of the wheat is n autumn and winter; the greatest after lea; some following beans, peas, s, on the clay soils, and some succeed- ips or potatoes. The land thus seeded rally well supplied with farm-yard manure, and a heavy yield is invariably the result. The total yield of wheat in Morayshire has for several years been from 20,000 to 25,000 qr. per annum, while the weight per bushel ranges from 58 lb. to 66 lb.

According to the Government statistics, the proportion of the total area under all kinds of crops, bare fallow, and grass, producing bere or barley, in Morayshire, is about equal to that of Fife, Forfar, and Berwick, a little below Haddington, and a trifle above those of Edinburgh, Linlithgow, Roxburgh, and Kincardine. There were 9002 acres producing bere or barley in Morayshire in 1855, and 11,815 acres in 1870. The season's growth of bere and barley in Morayshire would thus amount to between 50,000 and 60,000 quarters. The weight per bushel is from 50 lb. to 59 lb. Less attention is devoted to the cultivation of oats. The produce of rye is rather increasing in Morayshire. In 1855, the area under this crop was 471 acres, and in 1870, 1468 acres. Good crops of rye grow on sandy hills, where other white crops fail. It is only on the sandy soils calculated to produce little of anything else that rye is sown in this county. The quantity of beans and peas produced in Morayshire is not great. In 1855, beans are accredited with an area of 84 acres, and peas 224 acres, as compared with 107 acres of beans, and 40 of peas in 1870.

The light sandy soils of Moray have been long famous for rearing potatoes. Though the county, as a whole, is favourable for the growth of this crop, it is most extensively cultivated in the lowlands. Of the 19,652 acres returned in 1870 under green crop, 3711 acres were set down as producing potatoes, being 5 acres less than the figures under this head in 1855. Almost every farm of considerable dimensions on the lowlands contains from 7 to 30 acres of potato land every year. The quantity of the crop is invariably fair, and the quality of the tubers leaves nothing to be desired. Where the soil is very light, potatoes are planted after the lea. The planting season is from the 1st March till the 12th of May. The smaller patches generally receive a supply of dung before the potato seed is deposited, but the larger fields get only artificial manures.

Prior to the beginning of the present century, the proportion of the land under turnips was very small in Morayshire, as elsewhere, compared with recent years. It is almost needless to remark that the main stimulus to the extended sowing of turnips was the introduction of bone manure, guano, &c. By 1855, the turnip area in the county had reached something over 12,000 acres, which was gradually augmented, till 15,660 acres were returned in 1870. The county grows good turnips, especially on the Speyside farms and in the Forres and Alves districts. Even in Strathspey very heavy crops are produced, from 25 to 30 tons per acre being no uncommon yield. Probably about one-third of the turnips consists of swedes, and the proportion of this description of root is yearly increasing. The seed time is from 12th May till the 20th June. Farmyard manure is applied as far as it will go, and is supplemented by artificial stuffs. This supplement is often very extensive and costly. Singling is done by the hand-hoe. Storing the bulbs after they reach maturity is too much neglected in Morayshire, as in other Scotch counties. Probably no other branch of farm work claims more urgently increased attention on the part of the farmer. Field culture of carrots and cabbage is not very extensive in Morayshire—only a few acres of each being returned. Mangold has also a small area, but the samples produced are by no means inferior. The extent of bare fallow or uncropped arable was stated at 251 acres in 1855; and 145 acres in 1870.

The total area of grass or hay under rotation in 1855 was estimated at about 29,000 acres, and last year at 34,041 acres. Of this, nearly 7000 acres were returned "for hay." Owing to the mild climate and kindly soil, grass comes up very early in the lowlands, especially about Forres and Alves. Of meadow hay there is scarcely any in Morayshire, and as cattle feeding is becoming more remunerative, the proportion of the sown grasses made into hay is decreasing. Except what is intended for seed, the hay is cut early in the season, and the aftermath is then, with a moderate supply of moisture, almost as valuable as the first crop. Some very heavy crops of hay are reaped where a little grass manure has been applied. The quality of the hay is generally good. The most of it is consumed by the farmers' own horses and cattle.

The number of cattle in Morayshire is smaller in proportion to the cultivated acreage than in any county north of Forfarshire; but so far as the excellence of individual animals is concerned, the county has attained to considerable fame. The land being more exclusively arable and less pastoral than any other shire in the north, cattle, especially in summer, cannot be kept so numerously. The quality of the animals constituting the various herds is in general of more than ordinary merit. In 1855, the number of cattle in the county was set down at 22,421; in 1857, 23,231; in 1869, 23,441; and in 1870, only 22,621 head were returned. It would thus appear that the number of cattle during the last sixteen years has been about the same, though the cultivated area has been extended, and the produce of the soil has increased. The additional supply of food consequent on the recently increased acreage must, therefore, have been consumed by a more liberal allowance of provender to the live stock. That cattle, and sheep too, are fed more liberally now-a-days than they were fifteen—nay, even ten years ago, there can be no doubt; but that this circumstance sufficiently accounts for the consumpt of the lately reclaimed land produce, may be questioned. While the feeding has for a considerable number of years been more careful as well as costly, a very sensible improvement has been effected by a much more judicious selection of bulls. Of comparatively recent years, the number of farmers in the county who secured pure well-bred bulls from the more meritorious herds has increased greatly, but there is still room for a further extension of this policy. Crosses may be regarded as the mainstay of the county in the cattle department, and to rear these with success it should never be forgotten that of blood on the male side is indispen-

It is an all but established fact that
horthorned bulls with ordinary cows—
ry in shape, and comparatively remote
the pure line in breeding—will produce
cross cattle, whereas male animals of
vely indifferent breeding with cows
to the best in the land generally have
erior issue.

shorthorn herds are not numerous in
shire. Undoubtedly, the largest and
in the county is that at Orbliston, be-
g to Mr Geddes. This herd has been
stence about thirty years, and during
me Mr Geddes has been very success-
th in the local and national and short-
shows. The Gordon Castle herd,
ing to the Duke of Richmond, and
d on the eastern margin of the county, is
nown to be one of the best of the short-
l breed in Scotland. It need only be
, that the lot of bull calves sold publicly
tember last were, on the whole, the best
ve yet left Gordon Castle of one year's
. The herd of the late Mr Stephen,
oom, which had acquired more than
me, and had been established about
years, was dispersed about four years
d another old established shorthorned
which had attained considerable cele-
as sold out about the same time—viz.,
Mr M'Kessack, Balnaferry, near For-
The shorthorned herd which Mr Harris
stered since he entered on a lease of
ll, about eighteen years ago, was wholly
d of by public roup in March last. The
ll stock was famous a considerable
r of years ago, especially the cows, but
rd was dispersed before any of the
hree mentioned. Mr Bruce, Newton
thers, owns some of the best shorthorns
orth. His herd is not yet very large,
style and shapes of several of his
rns have secured for them leading
in recent years both at county and
l exhibitions. Mr Lawson, Brae, Los-
seses some good shorthorns, as also
r Rose, Sheriffston. Among the other
in the county who breed a few animals
breed are Mr Scott, Manbeen; Mr
Mackay, Burgie; Mr Brodie Innes of Milton Brodie; and Mr Yool, Coulartbank. The herds alluded to are in the lowlands of the county, only comparatively few bulls of the breed having found their way to the inland districts.

There are fewer breeders of polled cattle than of shorthorns in Morayshire; but for several years the polled department of the Elgin show-yard has been the best of the exhibition, and, indeed, second only to the Highland Society's display. To the muster at Elgin, however, two celebrated Banffshire herds—viz., those at Ballindalloch and Drumin—have contributed extensively. The best polled herd in Morayshire, and many people think in Scotland, at the present day, is that possessed by Mr Brown, Westertown, Fochabers.

Mr Paterson, Mulben, who has bred polled cattle for more than twenty-five years, was the breeder of the polled heifer from Burnside, which was an object of so much admiration at Birmingham a few weeks ago, and which lost the championship at Smithfield by an attack of foot-and-mouth disease. Mr M'Kessack, Earnside, has some good polled animals, and his herd is increasing in numbers, and improving in general excellence. Mr Grant, Advie; Mr M'Gregor, Balmenach; Mr Grant, Ballifurth; and some others in Strathspey, have a few fair polled animals. The herd of Mr Collie, late tenant of Ardgye, near Elgin, maintained a good position in its day; but it was decimated by pleuro in 1860. There are few Ayrshires and Galloways in the county, and the only genuine Highland herd now in Morayshire is that at Castle Grant, belonging to Lord Seafield. It has been in existence for about fifteen years, and is beginning to take a good position at the Highland Society's shows, after sweeping everything before it at district exhibitions.

Crosses between shorthorned bulls and polled and cross cows are numerous in Morayshire. Prominent among those who rear the better sorts of these crosses are Messrs Brown, Linkwood; Rose, Sheriffston; Fraser, Darkland; Ross, Hillhead; M'Cessack, Balnaferry; Garden, Grangegreen; Adam, Hillhead;

Petrie, Kirkhill; Hunter, Dipple; Sir William Gordon-Cumming, Bart., of Altyre, and others.

There are several very careful and successful feeders of stock, prominent among whom are Mr Harris, Earnhill; Mr Bruce, Burnside; and Mr Bruce, Newton of Struthers. Though these three gentlemen succeed in bringing out animals for the fat stock show-yards, displaying a higher degree of feeding and a more generally tasteful appearance, than probably any of the other farmers in the county, there are several tenants who feed cattle more extensively than they do. The largest feeder of cattle in the north of Scotland—Tillyfour, perhaps, excepted—is Mr M'Kessack, of Ardgye. He feeds annually, besides sheep, from 120 to 160 three and four-year old bullocks, and has for several years disposed of them at the Christmas market held in connexion with the Forres fat stock exhibition. Mr M'Kessack buys the most of his bullocks in the spring and early summer, prior to the selling period. He breeds a few, but the great majority are only grazed with him one summer. They are early tied in off the grass, and fed on Swedish turnips, cut with straw, cake, and bran.

The horses for agricultural purposes in Morayshire, while capable of improvement, are, on the whole well-built and spirited animals. In 1856, the number of horses for all purposes in the county was returned at 4850, and in 1870 at 4505. The stock of horses has thus, it would appear, rather decreased in numbers during the last fifteen years. This is chiefly accounted for by the fact that the breeding of horses was, if anything, more common for some years prior to 1860 than it has been since 1865, and may also be due to some extent to the diminution in the number of posting horses consequent on the opening of railways in the county. A sensible reduction in the number of farm horses will by-and-by take place as steam cultivation extends, but it will be some years at any rate before there can be any appreciable falling off on this account. There has been a general absence of first class Clydesdale stallions in Morayshire for some time, and since horses have advanced in price so much of late, inducing farmers to breed more extensively, this want has been felt more keenly. The Morayshire Farmers' Club has taken the matter up, and a superior horse from the south is expected to come to Morayshire next season under the auspices of the club.

The low-lying districts of Morayshire have reared whitefaced sheep with success for many years. The returns of sheep of all ages and breeds in the county, in 1856, number 59,740. Since then the sheep stocks have ranged from 50,000 to 70,000. The county being more a sheep-feeding than a breeding one, the numbers fluctuate considerably, according to the prices, and the chances of cattle proving more remunerative to the feeder than sheep. The sheep fed in the lowlands consist mainly of crosses. They pasture on sown grasses in summer, and fatten on turnips and cake during winter. Some farmers feed the sheep in the courtyard in winter, and others consume the turnips on the fields. The blackfaced sheep pasture on the hills in summer, and pass the winter in the lower districts, generally without the aid of turnips. In the feeding of sheep in the lowlands, cake and corn are extensively used in addition to turnips. When the ewes on the plains are well wintered, twin lambs in the spring are the rule, and sometimes there are triplets. Among the blackfaced flocks, however, pairs of lambs are not more common than triplets are with the whitefaced ewes.

The number of swine in the county in 1857 was about 4500, while in 1870 the return of pigs only reached 3461. Some farmers keep a considerable number of pigs with their young cattle in the folds, and others keep a few in styes for their own use. The breed of pigs is being gradually improved by infusions of blood from the more celebrated stocks in the south. Mr Lawrence, Forres Mills, and tenant of Thornhill, near Forres, has carried all the first honours with his pigs at the district shows for several years. Mr Reid, keeper of the Lunatic Asylum, Elgin, has had a few specimens of the more improved breed of pigs.

MR MECHI ON STEAM CULTIVATION IN ESSEX.

' the dinner of the Coggeshall Agricultural Society, which took place a few ago, Mr Mechi made the following re- :—

vwe come to a very important question— an we make farming more profitable, profitable for the tenant farmer, for the er, for the landowner—because they all go together—and more beneficial rofitable for the country at large ? That on is receiving a solution, for the great teresting feature of this year, agricultu- ıas been the trial at Wolverhampton of team-ploughing engines, and if you all read attentively the voluminous of the judges at those trials, it would ıce you, as it has convinced me—if I ıy doubt about it—that we must look : employment of steam power for the increase and profit of agriculture.

ESSITY FOR A FIXED ENGINE ON THE FARM.

re are great impediments to that in the r of Essex. One of the first is, that far- o not understand steam, and do not like the trouble of having it on their farms. ot refer to threshing machines, brought n to be hired, but to the very advanta- condition of having a fixed engine on m for the ordinary purposes of the farm, ctive of cultivation. I have had one nty-four years, and our people on my ırm of 170 acres would say they would ow how to get on without it. What me as very extraordinary is that plenty farmers—for there is plenty of money x—do not try the experiment. But the ation, I suppose, is, that having a team engine on the farm is a new because it entails a new arrangement as, it is different from shoeing your and having your harness mended, and nt from the ordinary work of a farm ıas been hitherto carried out. I believe that is the reason that it is not more generally adopted. It ought to be adopted. I see farms of 400, 500, and 600 acres which never ought to be for an hour without their fixed steam engine—that is, quite irrespective of steam cultivation.

IMPEDIMENTS TO STEAM CULTIVATION IN ESSEX.

Among the impediments are, the size of the fields, the incumbrances of trees, and of fences. It is impossible to come from London on the railway without being struck by this fact, that, small as the fields were originally, a vast number of them have been intersected by the railway and cut into halves or into thirds, what was a great evil before being thus rendered still greater. That is a question for the landowner principally, and next for the landowner and tenant combined. I hope and believe that the landlord will find it will be for his interest to give permission to abolish those fences, to do away with those trees, and put the land into such a condition that steam cultivation can be brought to bear upon it. Another thing, too, must be done—if the land be heavy and wet it must be drained before you attempt to steam cultivate it. There are some very interesting facts in connexion with steam cultivation. Some companies have been formed in Yorkshire, in Northumberland, and in other parts, with capitals of from £20,000 to £40,000 invested in steam cultivation to do the work by contract for farmers. But you must bear in mind, gentlemen, that in the district in which they are working, the fields are 20, 30, or 40 acres each. They could not profitably do it in certain parts of Essex on the same terms. But there is another very great obstruction in Essex—the engines could not cross your rivers, for on every bridge a notice is stuck up that no heavy machine is to go over it. No doubt that is proper, because, as was the case at Battles Bridge, the structure would fall in, and so would the engine—and when I wrote to Mr Eddington to say that I wanted some steam cultivation, he replied, "My machines are in Cambridgeshire. I should be willing to come to you but I cannot. The bridges will not carry our engines." I must here appeal to our magistrates to feel the pulse of the county, and see whether it will be much longer permitted that one of the most interesting and profitable operations of a farm is to be rendered unavailable, simply because the bridges are not put in suitable order.

STEAM BETTER AND CHEAPER THAN HORSE POWER.

But, gentlemen, do you know what is doing in regard to steam cultivation? I have taken great interest in this question. It is now fifteen years ago—for it was in the year 1856—that Fowler's steam plough was first brought on to my farm to plough the subsoil. But look at what is taking place now. An acquaintance of mine in Berkshire has four steam engines of 30-horse power each. Last year he succeeded in cultivating to a depth of 30 inches, but this year his cultivation is a yard deep. This is a very serious question. He is not a small farmer, for he has 4600 acres of land of his own, which he farms. I believe he has been wise not suddenly to bring the bad soil to the top, but when I tell you that last year he grew 1600 acres of sugar beetroot for the purpose of making brandy, it shews you, I think, that there is something going on in British agriculture. It is very clear from the facts that come before me that the cheaper class of engines are the most costly and the least powerful. I mean the work can be done cheaper by a 20-horse engine than by a 10-horse engine, although the price may be so much larger at first. I was told the other day that one of Mr Fowler's first customers who bought an engine of him for £1500 some fourteen years ago, as a practical farmer has now bought another for £1500, and it is not an uncommon thing for a man to buy two engines at a £1000 each as the cheapest way of cultivating his land. I will give you an instance. The evidence we had in the course of the Wolverhampton trials, shewed that 1 lb. of coal in an engine, moved 9 tons of earth. That alone ought to teach us that steam, as a power, is infinitely cheaper than horse flesh. A horse can lift another horse, or perhaps two, but 1 lb. of coal will lift 9 tons of earth, or put in a pumping engine it will lift 1,000,000 lb. weight of water, and lift it 1 foot high. I say that if we as farmers do not take the cheapest power, if we do not give up our prejudices in favour of our old customs, we are not quite sensible men of business. I am not quite so sanguine as to suppose the changes are to be very sudden. But there is one point I would call the attention of our landowners to. Three years ago the Duke of Northumberland had a conference with his tenantry, through his steward, with the view of getting to know whether they would like to join in a steam ploughing machine on certain conditions. These conditions were that his lordship was to buy a 12-horse power engine of Fowler's, at £1500; they then calculated how much would be the wear and tear, and how much could be charged to each for the use of the machine. The agreement was made and this was the result, that the tenants had their land ploughed at 10s. an acre, it was then cultivated very deeply the next time at 5s. an acre. If it was cultivated a second time after the first cultivation and the ploughing, the charge was 2s. 6d. an acre, and the harrowings were 1s. 6d. per acre—not such harrowings as we have with 3-inch teeth—but with machines of 12 inch and 15-inch teeth. That has been satisfactorily at work for three years. The Duke of Northumberland receives 5 per cent. interest on the money invested; the machine is kept in perfect order, with a reserve to buy a new one. There was a little difficulty as to who should have it first, and a very wise arrangement was come to: that was, that the man who first cleared his 30-acre field and gave notice, was to have it, and the next in rotation, and when it became an even question, they should draw lots.

SUBSOIL DRAINING.

By Mr WOODWARD, Old Newton.*

AINING is the withdrawal of superfluous or injurious moisture from land icial conduits. It is capable of classi- into surface draining, strata draining, soil draining; but I prefer to speak latter, as that with which I am most ted, and as that most required in this . I will give you, as near as I can, my perience.

DEPTH OF DRAINAGE.

are doubtless all aware that the system or tile draining has very much in- l within the last few years; and I am to say that, in my opinion, when well nd at proper distances and depth from o drain, with good pipes, it is done for me, if not for a permanency. Much en written by various eminent agricul- as to the distance and depth which st suited to subsoil draining. In my , the depth and distance are in a egree dependent upon each other, no ule can be laid down, and neither can led until the nature of the subsoil has roved. In a porous subsoil, drains rom a far wider area than in clayey s, and they may therefore be placed espondingly greater distances from one r, and it requires to be drained deeper. that 3 or 3½ feet deep, and from 7 rds apart on such soils, would be quite lent to 32 inches deep, and from 5½ yards apart on a stiff clayey subsoil. bout twenty-five years since we began g with pipes, and we began in a small t 6 yards apart, and 28 inches deep; ving a good landlord, and he, desiring provement of his estate as well as the of his tenant, strongly urged us to 3 feet draining, at the same time liberally offering to pay the whole cost of pipes for 3 feet draining. We at once went from 28 inches to 3 feet, and I must here state that the 3 feet drains commenced running, and continued to do so when no water was seen to run upon the 28-inch drains—this at once convinced us that the 3-feet draining was the best. The following year we drained the whole of the fallow shift 3 feet deep, varying from 6 to 9 yards apart, and so on from year to year, until we completed the whole farm, at a cost of about £4, 16s. for 6 yards, or £4, 4s. for 7 yards, and about £3, 4s. for 9 yards.

DISTANCE AND DIRECTION OF DRAINS.

Some member will perhaps ask me which distance I consider answered the best. I most unhesitatingly say the 6 yards did better than the 9 yards, and I am further convinced that the 6 yards is decidedly the best where the subsoil is of a stiff and clayey nature, inasmuch as, last year, not being satisfied with the 9 yards apart on one field, I had the drains examined, and found the pipes as clear as when laid in, twenty-five years since, but that part of the field being a strong subsoil did not admit of so free a percolation, and required to be drained closer. I think the following is a fair calculation as to the distance: a 3-feet drain on the very stiffest clay land will draw 6 or 7 feet on each side of it; in a partially impervious subsoil, 8 or 9 feet on each side; and in a very favourable subsoil, from 13 to 15 feet; but in every instance the rule may be regarded as applicable, that when the drains are made shallow, they require to be closer, and when made deeper, they may be at remoter distances, and I would here remark, as the present system of farming on the flat is so frequently adopted, I think it best to have your under-draining done as efficiently as possible, or as closely

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per read before the Stowmarket and Central Farmers' Club.

as the nature of the subsoil will admit, for we may be well assured that where land is so farmed, but little water will run off the surface; and I hardly draw water furrows except on a strong hill. As to the direction in which the drains ought to run, it has been a question whether it should be that of the inclination of the ground, or obliquely to that inclination, or quite across it. All this has been a question of much controversy. The late Mr Stevens maintained that when the ground has the least gradual descent, the drains should always be directed obliquely across the slope, or as directly across it as the nature of the surface and outlet will allow, and that drains winding across the slope or declivity of a field, whatever their number or depth may be, will have a much greater effect upon tenacious or impervious substrata, than if they were made up and down the slope, and I have heard some of our most practical agriculturists argue that it is best to drain your land across the slope when you can get a sufficient fall, but I think no fixed rule can be laid down, as it is best to cut the old drains across when sufficient fall can be had.

OUTFALL: THE KIND OF PIPES.

As to the quantity of land that may be drained by one outfall, when we first commenced draining with pipes, we thought it best to have an outfall for every drain, from 30 to 40 rods in length, providing we had not to cut through the bank; but after a little experience we altered our opinions, and found main drains with one outfall for every 2 acres of land to be the best. And I am further convinced that by using larger pipes for the main drains, that it is better to put as much as you can into one outfall, and I would suggest for the first two or three years using 3-inch pipes rather than 2½-inch, and, lastly, the common draining pipes. By this means, one outfall will be sufficient for 8 or 10 acres, and there is less liability of the outfalls being stopped by the running in of the soil from the bank or brow. I think it would be well to brick such outfalls 2 feet above the main pipes, thus affording a greater facility for cleaning out and looking to. It appears that the first tile pipes used for draining, were made about ninety years ago at Horsmonder, in Kent, and were about 3 inches in interior diameter, having a narrow slit from end to end, and supposed, though quite erroneously, to be requisite for affording infiltration to the water: but these pipes never came into use beyond a very limited locality. Tile pipes, without any slit, of a cylindrical form, began at a later period to be made in Essex, and were thence adopted in Suffolk. Even these were for a time unknown beyond the limits of districts in which they were made. In 1843, pipe tiles were made of various interior diameters, from 1 or 2 inches. An instance is reported in the Royal Agricultural Society's *Journal*, of 1843, in which Mr Taylor, of Brewer's Hall, in Kent, used the original, or slitten kind of pipes, and was perfectly satisfied with them, but he says, "There is now another sort of pipe tile made by machine, having no opening in their length, only at the points, and much thinner, which are used to greater advantage." We began with round socket pipes, and I am still of opinion where the subsoil is of a tender or broken nature they are the best. I think it is impossible for any soil to get into them, and I have before stated that, upon examination, after twenty-five years' trial, I found them as clear as when put in. I have also used the round butts and horseshoe, and found them to answer well, but if we have a broken soil, or cut across an old ditch, I would recommend collars in such places for these kinds of pipe.

FILLING IN THE DRAINS: WHO BEARS THE EXPENSE?

The next point to which I wish to call attention, is the filling in the drains. This is also a subject upon which there is great diversity of opinion, and I remember we used to be careful to first put the clay on to the pipe, then tread in as solid as we could; and under the old system of draining with straw, wood, or other materials, we used to fill a tumbril with stones, and drag it up and down, driving the wheels on the drains to get it solid. Undoubtedly many good drains have injured by such a process, but where are laid 3 feet deep, there is no occa- r so doing, but on the contrary, put all ose soil you can in, and spread the clay e surface of the land, thus illustrating dage, "He that marls sand will buy

With regard to who should bear the andlord or tenant, either in whole or in hat is a matter that must be arranged en landlord and tenant. Of course, no tenant could be expected to pay the cost of pipe draining. I think, upon a tenancy, the landlord should pay the cost of pipes, the tenant doing the r. The tenant could not be much out cket by so doing, if he hired his farm the Suffolk covenants. If a long lease, k the landlord paying half the cost of and the tenant paying the other half abour, would be about fair; but, as I efore said, it must be settled between landlord and tenant. I feel I should not have opened this subject sufficiently, unless I had alluded to what I consider are some of the advantages of thorough draining. The straw of white crops shoots up steadily, at the same time so stiff as not to be easily lodged by wind and rain, and less liable to mildew; the crop ripening more uniformly, is more prolific, more quickly won for stacking, and produces fewer small and light kernels; it increases the growth of root, thus enabling the heavy land farmer to keep more stock; it greatly improves the quality of grass upon pastures; grass lands which were formerly wet and rushy, become thickly carpeted with fine nutritious grasses, maintaining a greatly increased number of sheep and cattle, and preventing sheep from being attacked with rot. In conclusion, I would ask, is subsoil draining thoroughly carried out? I feel bound to say I think not.

SEWAGE FARMING.

R JAMES T. BLACKBURN of "The Camp Farm," who has long been ed in sewage farming, and on the whole successfully, has sent a letter to the , in which he says the disposal of e has during the last year lost none of erest or importance.

last new process which the authori- towns have been asked to sanction is ittent filtration, originally invented ggested by Dr Frankland, as worthy l under certain conditions only, but nergetically recommended by some few ers and others; nevertheless, I must at if it is adopted in any locality where ion is practically available, it can but wed as so much loss in the shape of o the country. We are told, from the ence, be it remembered, of a few s only, that the sewage of 3000 persons e filtered of its impurities through 1 f land, and also that edible vegetables can be produced on this intermittent filter at the same time; but any reliance which may be placed on the appropriating or scavengering power of such an infinitesimal amount of vegetable growth as can be raised under such conditions must be futile in the extreme—in fact, about as hopeless a task as ten men attempting to scavenger the streets of London. Therefore, purification in this case must depend almost solely on the unaided resources of the soil itself, and my conviction is that such vast accumulations of manure coupled with the action caused by the solvent powers of sewage will in time absolutely choke up its pores. I may say this opinion is based on many years' experience of the treatment of land under sewage, combining a variety of sources.

Some of the advocates of intermittent filtration attempt to create what is purely an imaginary difference between irrigation and filtration, which, so far as the soil is concerned, really does not exist; irrigation—that is, utilization—embraces filtration, the principle in both cases is the same; but the application of that principle involves the question of the production of food in the one case and waste in the other—in fact, irrigation does all that intermittent filtration is said to accomplish, with the valuable recommendation of producing food in addition, besides which the cleansing process of vegetable growth involves a constant abstraction of the fertilizing matter deposited in the soil, and the almost continued conversion of the same into food maintains its filtering powers unimpaired. Sewage utilization and purification must go hand in hand, and it will be a great national loss if the latter is only considered and rendered subservient to the former. I have myself made a filter of all parts of my farm since the year 1864, the extreme poverty of the land rendering it necessary that it should be supplied with large quantities of sewage matter before any vegetable growth could be obtained. This was accomplished by deep cultivation, with thorough soaking at short intervals for about a year, a few deep drains having been put into the land where found necessary. It has also been asserted as one of the drawbacks to sewage farming that the experience said to be gained on the cultivation of Italian ryegrass is that it may readily be grown in excess of the demand in a green state. But there can be no necessity to limit the culture of so valuable a plant on that account, and it is admirably adapted for the profitable conversion into that which is in ample and ever-increasing demand—viz., dairy produce or meat. As to the large quantity of sewage it is said to appropriate, I find that depends a good deal on the cultivation pursued. Under this management, it yields a higher return per acre than most other crops, with the manure resulting from its consumption in addition. In support of this, I know instances where cowfeeders pay from £25 to £40 per acre for the grass, which means a gross return in milk or butter of something like from £80 to £100. We are again told that the produce of sewage farms loses much of its value directly it over-reaches the home market, and with large areas used for irrigation in the neighbourhood of a town this may easily be done. Now, if such has been the case this year on some farms, the cause cannot have arisen from the large area irrigated, but more, I am afraid, from want of judgment in growing the right crops and the after-disposal of them. Can a single instance of a sewage farm be brought forward in support of such an assertion where a fair proportion of its yield has been turned into dairy produce, the deficiency of which in this country has been marked by a continued rise in the price of butter for the last twenty years, and the fact that some £7,000,000 sterling are annually paid to other countries for this article alone, to say nothing of cheese. This would appear to shew the policy of relying mainly on the growth of that which is always in demand irrespective of the seasons. But what has been advanced as a remedy for this year's plentiful supply of vegetables is really worse than the disease, viz., that, by adopting intermittent filtration, which, it appears, is to necessitate the resting of the land for a year or two, this much-dreaded overstocking of the market may be avoided. According to this mode of procedure, the most effectual cure would be to rest the land altogether, taking as an example the poverty-stricken districts of this country, where half the land is in comparative rest, thus causing scarcity of home-grown food and a dependence on other countries. Whether this can be considered an advantage of intermittent filtration I leave others to determine. The balance-sheet this year will shew sewage farmers the fallacy of relying too exclusively on market-garden produce in which they must always meet with active competition, more or less according to the season. The late glut of vegetables in the market has to some suggested the idea of growing cereals, and it has been seriously proposed that farmers having the command of sewage, with all its advantages, should grow that which can be obtained of much better quality and cheaper from America, Russia, and elsewhere. Moreover, there is no doubt that, under ordinary agriculture, the rest of the country could successfully compete with sewage farms in the growth of grain crops. A deeply-cultivated, well-manured soil will retain in this climate a sufficiency of moisture for the perfecting of the growth without any additional supply from sewage or other artificial sources. All our leading men have long since agreed that the future success of our home agriculture must depend largely on dairy produce and meat, and I think it would shew a want of sagacity in any sewage farmer to adopt so retrograde a step as a dependence on corn growing when he possesses such extraordinary facilities for raising green crops.

Unfortunately, sewage farming at present bids fair to rival the early days of railways, so far as extravagant expenditure is concerned. The whole question is surrounded with many difficulties of our own creation. We hear recommended intermittent filtration on one hand, and an exaggerated quantity of land as necessary for utilization on the other, both, as I believe from long experience, equally erroneous, and the mere idea of these extended areas is driving many towns into the other extreme of intermittent filtration. A sewage farm should, I maintain, consist of such an area of land as will convert on the smallest space of ground the largest amount of sewage into vegetable growth without waste, thus recognizing the economy of intensive as opposed to extensive farming, and to do this such plants must be grown as can build up the greatest quantity of fertilizing matter into food in the shortest time.

By all means put a stop to the nuisance arising from the pollution of our rivers; but instead of destroying that which occasions it as an enemy in an intermittent filter, convert it into a friend that will help to feed the British subject.

THE BREEDING OF POLLED CATTLE.

By Mr S. J. WALKER, Portlethen.*

CATTLE have of late years become to the farmer in this country an object of greater concern than formerly, inasmuch as, from the high prices of butcher meat, it is more desirable than ever to put fat on the animals as quickly and cheaply as possible. To attain this desirable end, more is required than the mere food consumed, however nutritious it may be. I hold that good quality and easy feeding are unmistakeable evidences of high breeding.

THE CATTLE TO BREED : CROSSING.

I recommend the polled Aberdeen and Angus breed of cattle to start with, if your tastes induce you to adopt a pure breed, because, for this part of the country, all things considered, I know of no pure breed equal to them. But if you are inclined for a cross or mixed stock to rear bullocks for the butcher alone, then let it be of black polled cows, well selected, and good shorthorned bulls. In these crossings with different breeds, you should not go much further than the first cross. There is afterwards a tendency to long legs and coarse bone and loss of good feeding properties. I do not believe in farmers keeping and breeding two distinct pure breeds of cattle at one homestead, however careful the farmer may be. Black polled cattle were known first, I believe, in the counties of Aberdeen and Forfar as the Buchan and Angus "doddies." I think the Galloways and the Aberdeen and Angus are two distinct breeds. At no very recent date it was said that some breeders of Aberdeen and Angus cattle, thinking to improve their herds by a dash of the Galloway blood, introduced some of it into their stocks. To all appearance, the desired results were achieved in the first issue, but the succeeding generations did not encourage further experiments in that direction. The Aberdeen and Angus cattle are now bred chiefly in the counties of Aberdeen, Forfar, Banff, Moray, and Kincardine. The old Angus and Buchan "doddies," though in their general character very much alike, possessed distinctive features in several instances, especially in the quality of the hair and skin and the size of the ear. The Angus and Aberdeen cattle, from the intermixing of the various herds, have become one and the same.

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* Read before the Kincardineshire Farmer's Club.

BREEDERS OF POLLED CATTLE: POINTS OF THE BREED.

Foremost among the early breeders of polled cattle, and one who in his day did very great service in improving the breed, was the late Mr Watson, of Keillor. Next to him, I might mention Mr Fullerton, Ardovie, now at Ardestie, from whose stock, dispersed some twenty years ago, not a few pure animals trace their descent. Of late years the breeders of improved polled stock have largely increased in number. I suppose my father is now the oldest breeder of polled Aberdeen and Angus cattle alive. The first notable bull he had was Portz, by Colonel, from the tribe of Rosie—a dowry cow. His sire, Colonel, was calved in 1818. Since that time the polled Aberdeen and Angus have been the only breeds bred and kept at Portlethen, and the aim has always been to improve the breed, and by all means to keep it pure. The points of a good polled Aberdeen and Angus bull may be described as follows:—Colour black, head neatly put on, clean throat and sweet muzzle, not over long between eye and nose, eye bright and prominent, ear moderately sized, good breadth between eyes and poll high, neck long and clean, moderately full on top, chest full and deep, legs short, but not so as to give the animal a dumpy appearance, horn clean and free from coarseness, shoulders not too full, and top free of sharpness, but not over broad, back level and straight, ribs well sprung, deep barrel, well ribbed home towards the hooks, full behind the shoulders, hooks level, but not too broad for other proportions, well and evenly fleshed to tail, twist full and long, well fleshed down, but not protruding behind, tail of moderate thickness and hanging straight, hair soft and plentiful, skin of moderate thickness and mellow to the touch, body fully developed, and the animal when in motion to have a blood-like look and style about him. A cow should differ from a bull in having, instead of a broad masculine-looking head, a neat feminine one, the ear should also be of good size, with plenty of hair on it, the neck well put on, clean and straight, and without any prominence on top or abrupt hollow where it joins the shoulder, the top of the shoulder sharper than that of a bull, and the shoulder thinner. In both, scars are objectionable.

THE POLLED AND THE SHORTHORN COMPARED.

It is the breeder's aim to get his stock to flesh evenly, and his feeding to fill up in the most valuable parts. Freeness from a tendency to bumpiness or patchiness is also desirable, but I do not believe, as some people seem to do, that such symptoms are sure signs of impurity in the polled breed. In fact, I know from experience and observation that such is far from the case, and is often the effect of in-and-in breeding and want of attention in the proper selection of sires and dams, and should not, therefore, be recognized as any rule or guide in this matter. The polled breed, for their bulk, weigh heavier than shorthorns or crosses, and command the top prices in the leading markets. They are hardier and thrive in our open and exposed country, and where shorthorns could not. We should consider these questions—What class of animals breeds most surely, suits the climate best, is hardiest, least liable to disease, most easily kept, gives the best and greatest quantity of milk, grows and fattens soonest for the amount of food consumed, weighs heaviest for bulk, and when ripe realizes most per cwt.? My answer is, that the Aberdeen and Angus polled breeds come nearer to these standards ny other breed I know. I am con- there is a great mistake made by s and graziers paying so little attention lly to shelter their stock over-night in elds. One bad, cold, wet night will iore flesh off an animal than two good mes will put on, besides the injury to the :ution of the animals. Shorthorns or s grow faster than polls, but eat about urth more food. This was tested by her and the late Mr Williamson, in his e principal butcher in Aberdeen, at an m, by a careful selection of four polled our shorthorned cross heifers. Each l was weighed and valued, put on the kind of keep, and all got as much turnip raw as they could eat. The result was he shorthorned crosses required one- more food, and when all were sold off er at the end of April, the polled ls brought a couple of pounds a-head than the others. The first three months osses appeared to gain on the polls, spring the latter made up fast, with sult stated.

REE STOCK: POINTS TO BE OBSERVED BY BREEDERS.

igree stock should have more attention o them. What are pedigrees doing for rs and owners of shorthorned stock in nd, America, and elsewhere? Why, them in some cases from 1000 to guineas for animals worth to the butcher rom 30 to 40 guineas, or even less. I that the Highland Society, and all the agricultural societies in the country, make a distinct rule, that the test of imal being a pure-bred shorthorn or iall be the herd-books of these breeds; ake it impossible for any animal to be exhibited in these classes at any show whose pedigree cannot be traced through the herd-books. I hope to see the day very soon when breeders will decline to purchase any animal, however good its appearance, for breeding purposes, whose descent cannot be traced through the herd-books in an unbroken line. Though the fashionable and proper colours of the polls is black, it sometimes happens that one appears of a brownish tinge, and I have seen some quite red. These are generally of good quality, and excel in milking properties. To keep up the strength, character and quality of a breeding stock, a judicious blending of the tribes and introduction of strange blood is occasionally necessary. Breeding in-and-in, though it may be, and has often been, resorted to with advantage, should only be the exception and not the rule, and may as often be attended with bad as good results. The tendency among farmers is to confine young stock too much in winter. The great bulk are tied up, but they will grow and thrive better kept in loose boxes or warm straw yards, with plenty of room and good ventilation. This will be especially apparent after the animals are sent to the grass, and landlords should, in building new steadings, see that part of the cattle accommodation is devoted to loose boxes capable of holding a limited number of animals in each. Neither the bulls nor the cows in a breeding herd should be kept fat, but in good fresh condition. After a few practical observations as to the treatment of the cows at Portlethen a short time before and after calving, Mr Walker continued—If possible, all calves should be suckled, and when weaned care should be taken not to allow the calf-beef to disappear. Some artificial food ought to be given for the purpose.

THE LAND TENANCY LAWS.

By Mr M'Neel-Caird.

MR M'NEEL CAIRD, who has for many years taken a great interest in all that relates to the tenure of land, accepted an invitation from the Scottish Chamber of Agriculture to deliver an address on the subject, which we here quote.

I have willingly accepted the invitation of this Chamber to introduce for consideration the municipal laws which regulate the relation of landlords and tenant-farmers in Scotland. I do so in a spirit of perfect friendliness to both landlords and tenants, appealing to tenants to state their grievances in temperate language; appealing to landlords to examine them without prejudice; appealing finally to public opinion to hold the balance even between them, should they be unable to agree.

TENANTS' IMPROVEMENTS AND LABOURERS' COTTAGES.

The question of tenants' improvements is of great interest in England as well as in Scotland.

When a man's possession is precarious, or his lease is approaching its termination, every ton of purchased manure which he puts into the farm is a premium to somebody else to offer a higher rent over his head. Common prudence compels him to hold his hand, and to take out of the farm as much as he can get on a reduced expenditure. The productive power of the farm is thus diminished, and this is a source of a great national loss. It is hurtful also to the landlord, and hurtful to the in-coming tenant, who incurs a heavy expenditure at the beginning of his lease, to restore the fertility of the farm. The reduced production by which he suffers, and by which the landlord also suffers through him, commonly continues till he has gone over at least a full course of cropping, for his restorative treatment and manures have to be applied at the appropriate stages of rotation. Neither is it for the advantage of the out-going tenant to starve the farm, if he were protected against the loss of his unexhausted manures and tillages. The only other course which an ordinary out-going tenant can reasonably be expected to take, under the present law, is to use such quick acting manures as shall exhaust themselves before his term is out; and these are not restorative, but stimulant and exhausting. The true interest of all is that he should have a right, by law, to have the value of his unexhausted manures and tillages allowed to him on his removal. You might then expect that farms in general would be kept in full fertility till the end of the lease, and the whole country would benefit by it. It would be a just and wise policy for a great landowner to establish, as the rule of his estates, that where he means to treat at all with the old tenant, he should settle the new lease before the beginning of the last course of cropping under the old lease. Unfortunately this is almost never done. Reflect for a moment on the amount of wealth which is lost to the country through the want of reasonable arrangements on this subject. Have we any means of roughly estimating it? On a seven-course farm, held on a nineteen years' lease, you may reckon that the last five years will be a period of reduced expenditure by the out-going tenant, and of exhaustive cropping. Then the first seven years of the new lease will be a period of liberal expenditure and gradual restoration of productive power. For the next seven years you may expect the farm (unless it had been greatly reduced), to be in full fertility; and then begins again the evil cycle of exhaustion. You will have on the individual farm seven years of Egyptian fatness, alternating with periods of comparative leanness; but the lean years will be in the proportion of twelve to seven. Where there are no leases and no compensation on removal—remembering the motives by which men are commonly influenced—the leanness will be apt to become chronic, unless in exceptional cases, such as where the character of the landlord gives a tenant all the security which he could have from a lease. Then, consider that this reduced production is in constant action everywhere. And when you remember the enormous value of agricultural produce in Great Britain, even as things are (estimated by the best authorities of 200 millions a-year, and by some much higher), you may form a conception of the wealth which might be poured into the coffers of the country through the pockets of farmers, if by wise legislation on the sub-

sed on the motives by which men
ed on, you could sustain the land
fertility during the whole nineteen
a lease, instead of seven out of nineteen,
five-course farm, nine out of nineteen.
carcely suggest that when the value of
additional produce finds its way into the
pocket, it is according to all experience
inconsiderable share of it will soon pass
rent-roll of the landlord, and no small
it will also go to find work and comfort
agricultural labourer. Nor is there any
l subject of more paramount interest to
it bulk of the people than the increase of
rown food. In a hundred years the average
e of agricultural produce per acre in Great
has been only 16½ per cent. Of that
one-half has been gained by a sudden
ice 1851. The start of the last twenty
s equal to a gain exceeding £16,000,000
or the future. And if so much has been
lished by merely exhorting the farmer to
vhat may not be expected if we strike off
ers which have hitherto restrained him?
tenth that we can add to the acreable
e is equivalent to twenty millions a-year.
as this is, the field of agriculture is so
hat a mere annual change of seed, if
l universally, would go a long way towards
ne increase of return and improvement of

And besides the increase of acreable
there are still immense tracts which can
dered profitably productive. I will not
nit to the possible increase which might
ined if all hindrances were removed.
observant man, whose attention has been
l to the subject, must have seen practical
iat the produce of vast districts is capable
g increased, under proper treatment, not
hs merely, but doubled, and more. I can
from authentic information, that the
e of stock and produce on an extensive
ithin a very limited period, has, by the
application of capital and energy, been
ian fourfold, though the operations are
omplete. That was where the occupier
om special circumstances, altogether
ered by tenancy laws. The average
io doubt be always greatly below
ate of increase. But make every
ce, say that only a-twentieth of that
uld be attained on the average, the in-
of wealth to the country could not be less
millions sterling a-year, the absolute
of the soil. What are all the cheese-
of ordinary Statecraft, necessary though they be, while such a leak of national wealth is left unstopped? And how mightily would the increase react on commerce and trade? Again, if an enterprising farmer erects farm buildings or labourers' cottages, or executes drainage or other permanent improvements, the law is prompt to punish him for his rashness. The house is no sooner built, the moment the improvement is executed, the law takes the ownership of it from the man who built it, and transfers it, without compensation, to the landlord. The high priests of the law pronounce the formula, inædificatum solo, solo cedit, and every tenant must bow his head and submit, so potent is this mystic phrase to juggle away men's rights. It contains a dogma of the legal creed which lawyers generally accept with unquestioning reverence. In plain English it just means, "What is built on the land belongs to the land." It is an assertion, not a principle, or even an argument—an assertion not always supported by fact or reason. We are told in God's law, "The sea is His, for He made it," but in man's law the reading is reversed, the house is the landlord's though he did not make it. That is the law of this country. Is it reasonable? Is it just? Is the law to cast the balance always and irreversibly against the tenant? In England they have a law of the same kind. Buildings put up by the farmer belong to the landlord without compensation. The tenant it is said may even be compelled at his removal to pay for putting into repair buildings which he had himself erected. The subject was very fully investigated by a Parliamentary Committee. Witness after witness shewed that this law is a great hindrance to good farming. Here is a case, by a Gloucestershire witness:—"I was over a farm yesterday (it was college property), where the tenant had expended £3000 in erecting buildings; and yesterday he was called on to pay for dilapidations upon those very buildings. I was employed by the tenant to meet the valuer on the part of the college, and though he put up nearly all the buildings, every wall and stone, and every bit that was broken down, we were obliged to put a value upon. That was very iniquitous." Our American brothers have adopted the opposite rule for their unoccupied lands in the west. They call it the Homestead Law, and it is one main secret of the amazing growth of that great country. Its substance is, "Where a man builds his house and settles, the *land* shall be his." It is a wise and noble law for an unappropriated country. So, you see, the rules of law are capable of being

adapted, as they ought to be adapted, to the circumstances and wants of society.

In this country the great bulk of the land is already appropriated, and our circumstances, therefore, require a rule regarding buildings different from the American rule, as well as from that which has hitherto prevailed. The least that Parliament can do is to establish some such rule as this—What a tenant builds shall be his, and he may take it away unless he is paid for it. That would be just to both landlords and tenants.

It is a striking illustration of the blinding effect of a bad law, that a landlord so well spoken of as the Duke of Buccleuch lately went into court to claim, without payment, the wire fences which a tenant had put up. That was too strong a dose even for the legal stomach. I feel convinced, however, that his grace will be one of the first, when his attention is drawn to it, to consider in a just spirit the claim now made for the tenants. I have no doubt you have read with interest the story of Mr Scott Russell and the Council of Skilled Workmen, and the veiled Council of the Lords of Legislation. Some of the schemes which they broached are most commendable in their object, some (like the demand that goods shall be sold by retail at wholesale prices) are perhaps a little after the order of the conjuror who was to get into a quart pot, without reducing his size. But is it not a sad thing that the skilled workmen—the very aristocracy of labour—when promulgating their plans for regenerating society, had not a word or a thought for their humbler brethren, the unskilled labourers of the country? Is there to be nothing done for them? Their domestic accommodation in many parts of the country is simply disgraceful—without the means, I will not say of ordinary convenience, but even of common decency. In examining some statistical papers, a few years ago, I came on facts which made a very painful impression on my mind. I found that there were in one county—the wealthy county of Ayr, more than 18,000 families, not fewer probably than 80,000 persons, living in houses of one room; and in all Scotland more than a million of our fellow citizens—actually above a-third of the whole population—living in houses of that miserable kind. Of these, about 8000 families, or from 30,000 to 40,000 persons, live in houses of one room without a window, lighted only by the door, or by an opening in the roof or sidewall, serving for both window and chimney. Who shall stand up to justify such a state of things as this? Our law of strict entail disables, our law of parish settlement disinclines, a great many landlords to do much for the labourer's dwelling. And the labourer's employer, the tenant-farmer, his natural ally, who is most deeply interested in his well-being and well-doing, and who would gladly do something to lift him out of his degraded position, is sternly prohibited by law from improving the house accommodation of his people, under the pain of having his expenditure confiscated to the landlord.

HYPOTHEC.

I intend to be very brief in regard to the law of agricultural hypothec, for it has been amply discussed, and has already been condemned by this Chamber. In words which I have used elsewhere, "it keeps the tenant under a perpetual mortgage, even before the rent is due. It touches his credit, and hampers him in dealing with his stock and crop, and, if misfortune overtakes him, it operates most unjustly against his ordinary creditors." I think proprietors are considerably misled by this law. In the long run, a proprietor cannot by any means whatever extract from the land more than it is worth. A particular proprietor may get more than his just share now and then, but taking it over a long term of years, these things are sure to adjust themselves. If a landlord gets a tenant to promise him too much rent, the retribution will come in a year or two, and he may have to content himself with too little. The man will exhaust the farm and be turned out, the farm will get a bad name in the country, and a good tenant will be shy of taking it. And I adopt and endorse the opinion which has been well expressed by my brother:—"What we do object to is, that the law should give inducements and advantages to landlords to enable them, without risk, to encourage men of straw to compete for farms, men whom under a different state of the law they would not accept as possible tenants My only interest now in Scotland (he adds) is as a proprietor. But I feel very strongly that the present arrangement of the law places the tenant at an unfair disadvantage in making his contract, and while its removal would be just to tenants, it would not take from landlords anything they are entitled to, or that on the average in the course of years they could actually realize. For when a man without means gets a farm at a rent which in the end he cannot pay, his failure has a very bad effect on the landlord's interest, and the consequent loss is often far greater than the temporary gain."

INCAPACITY BY LAW OF TENANT-FARMERS TO TRANSFER THEIR LEASES.

The next point to which I shall ask attention is that, apart from stipulation, and by mere force and presumption of law, an ordinary farm lease cannot be effectually transferred by the tenant unless he can obtain the landlord's consent. The lease is the tenant's property—very often, through his skill and expenditure, a very valuable property. I stand here to claim for the tenant one of the essential rights of property—the right to dispose of it. Consider the case of a tenant-farmer who has his means locked up in the land, and whose health or circumstances disable him o remain in the management, though he may have many years of a valuable lease to run. What is the worth of his valuable property then? He cannot sell it—he cannot sublet it. But the rent is growing, the seasons for cropping are running on. He is unable to wait. He can do nothing but cast himself on the mercy of the landlord. He is constrained to renounce the lease, and the landlord enters to his labours with such compensation, if any, as it is of his mere pleasure to give. Is it a righteous law which puts the tenant-farmer into that predicament? Take the case of a child, a few years old, succeeding his father's lease. Fortunate indeed will he be if he has friends possessed of the courage, and the ability, and will, to undertake the grave risk and responsibility of farming for a minor, during twelve, fifteen, or eighteen years to come. For if they are not, his rights also must be placed at the landlord's mercy. And then consider what may be the position of the tenant-farmer on his deathbed, with the bulk of his means invested in his farm. The law does not permit him to regulate the succession to his own lease. How is he to secure a home for his widow? His eldest son may be settled abroad, or have no knowledge of farming: he may be a spendthrift or a drunkard; but the unfortunate father has by law no power to leave the lease to any other of his children. That is not the case with other property. The full owner of house or land may leave it to anybody he likes. The eldest son there takes only if the owner does not settle the property otherwise. Entails even are not an example of the contrary, for entails are not created by action of the law—each has its foundation in the will and act of the absolute owner. But in the case of the tenant-farmer, the law which forbids him to transfer the lease has been stretched to exclude him from selecting his heir. Lord President Islay Campbell, when he was outvoted on this question on the bench, indignantly exclaimed "It is not common sense" for the landlord to control the tenant's succession. I may venture to add it is not common justice. But it may be said the landlord may give effect, if he chooses, to the tenant's will cutting out the eldest son. And no doubt he may, for this law is not founded like some other laws, on any tenderness for the claims of eldest sons. It is a law expressly for the interest of the landlord; which can be pleaded by nobody but the landlord; which is, therefore, not available to the eldest son if the landlord chooses to accept the heir named by the tenant. And here is a climax to the intolerable wrong of this law. It puts both the eldest son and the selected heir at the mercy of the landlord. It practically gives the landlord power to choose between them. He could, if he pleased, play the one brother off against the other, and make any terms he liked. I willingly believe that such an extreme abuse of power would be indignantly reprobated by nine hundred and ninety-nine out of every thousand landlords. I think it reasonable that in any alteration of the law, the original tenant should remain responsible to the landlord, along with the tenant to whom he transfers the lease, unless the landlord has been a consenting party to the transfer. The legitimate interests of the landlord cannot suffer any real injury by a transaction whose legal basis would be that he should have a new man bound to him, along with, and in addition to, his original tenants. It may seem strange that the law should thus prohibit a tenant from transferring his lease, for this prohibition is the offspring of the common law, and the genius of the common law is generally hostile to restraints on the transfer of property. Entails are the work of statute over-ruling the common law. The truth is, that the courts of law had begun, in very early times, by settling certain principles which they thought applicable to agricultural tendencies in the state of things which then existed; and when courts of law have established the principles which are to guide them, they go on to carry out these principles, as established, without much right to consider their policy, or the changes which time may make on the nature of industries.

SHORT WARNING TO REMOVE.

I now pass from these great grievances to others which, though of less capital importance, are sufficiently galling. The legal warning of forty days to leave a farm is quite inadequate. The exigencies of modern agriculture require a farmer to look a long way a-head. He prepares in summer the cattle that are to be fatted in winter. Whenever the corn is off the ground, the tillage for next year's crop should begin. He can hardly get his winter crops in too soon. When he manures his green crop, or folds sheep on his turnips, it is in preparation for the grass crop which is to grow, not in that year, nor the next year, but the year after that. Yet he may be kept in the most painful uncertainty whether he is to remove or not till he reaches the forty days before Martinmas. The old law was more reasonable. It made a difference between removals in May and removals in November, in the very mouth of winter. Till 1853, a tenant could not be removed at the winter term without notice forty days before the 15th of May. That gave him six months besides the forty days. But in 1853 there was a Bill in Parliament, a technical Bill, to regulate the business of Sheriff Courts, A clause was slipped into it that there should be no longer a distinction as to removings between one term and another, that forty days before the actual term of removing should be sufficient in all cases. Away went the six months at a blow I cannot hesitate to say that, having regard to the expenditure which a man has now to make on his farm, and the necessity he is under of farming on plans which contemplate the future, no agricultural tenant ought to be removable on less than twelve months' notice at least.

INSUFFICIENCY OF CAPITAL FOR HIGH CULTIVATION.

One hears a continual cry that the capital applied to the cultivation of the soil is inadequate. There is scarcely anything in the world more sensitive than capital. The change of a Minister, the illness or recovery of a sovereign or a prince, nay, a breath of rumour, is marked in the rise and fall of consols, just as a barometer marks every change of temperature. This is familiar as the alphabet to all statesmen. Yet, in dealing with agriculture, the fundamental industry of the country, whose scale is so gigantic that its annual growth of produce, capitalized at thirty years, represents the mighty aggregate of £6,000,000,000 sterling, they, by short-sighted laws, place those who employ their capital in that industry at every economical disadvantage. They leave the investment insecure as to tenure, liable to expulsion on the shortest notice ; they make it artificially intransferable ; they subject it to exceptional priorities for landlords' claims ; to absolute denials of justice in the courts of law; they punish it in every direction ; sanction its being eaten up or trodden down by the undue multiplication of wild animals for sport ; even confiscate it altogether if the tenant puts it into the shape of buildings or drains, or lasting enrichments of the soil—and then are surprised that capital so treated comes sparingly in proportion to the needs of profitable improvement and culture. How can you expect free capital to subject itself readily to such conditions? The real wonder is that it comes at all. If all this were done in a half civilized country like Turkey, everybody would recognize its suicidal folly. This giant industry, on which the people depend for bread, must now be set free. It is no longer safe to limit the food of 30,000,000 of freemen by laws favourable to a few, at the cost of the rest. Give just security to the tiller of the soil. Don't deter capital by laws adverse to commercial equality. And in an undisturbed country like this, where unbounded capital is constantly seeking for employment, the only limits to the investment of capital in the growth of food will be the natural limits of demand and profit. The Minister who, by merely removing hindrances, shall fully disclose the perennial fountains of agricultural wealth, and so bring comfort to the homes of the millions, shall go down to posterity as one of the chief benefactors of his country. I would say one word to the millions also. All this progress, all industrial progress, is to be found only in the path of order. Let us trust with confidence to reason and opinion, which are now nearly omnipotent in this country. A few months of violence would destroy the industries on which we all depend, and which a thousand years could not reproduce.

CONCLUSIONS.

I have now gone, I hope with reasonable brevity, through the points which I think it right to bring at present under the notice of the Chamber. I am bound in fairness to say that the existing state of the tenancy laws is not justly chargeable against the landlords. No doubt the interest of landlords has predominated in Parliament, but only one or two of the laws which I have noticed have been brought in by Parliament. Had the principle and policy of these laws been discussed in the Legislature, no one could have had the hardihood to propose such a system on the whole as a just or satisfactory method of regulating transactions between man and man. They are, as I have said, the unhappy growth of principles adopted by courts of law in early times, as suitable to a state of society and a system of farming which are long obsolete. But they are the source of recurring and substantial injustice, and I feel assured that if the tenant-farmers will join heart and hand in demanding their removal, their cry shall not be in vain. The hands of Parliament are probably too full to allow of much progress there on this subject in the coming session; but if the tenant-farmers speak out manfully, and resolve to act manfully, these things will take their place among the great questions of the next session. One thing is sure: there is no power in this country which can perpetuate injustice. I don't believe there is any considerable power possessed of the desire to attempt it. The great body of landlords are reasonable men, infinitely better than such a state of law might have been expected to make them. If, indeed, the exceptions had not been limited in number—if one-half, nay, perhaps, if one-tenth of them had exercised to the full the extreme rights which the law has given them—the agriculture of Scotland could not have been in its present condition, and agrarian feeling might have run as strong in this quiet country as ever it has done in Ireland. The good sense and right feeling of the landlords as a body, and the good sense and patience of the people, have preserved us from that calamity. But no wise statesman will withhold the rectification of bad laws because they have not been worked to extremity, nor because their amendment is not demanded with riot or menance. I fully recognize the communities of interest which exist for landlords and tenants, and the importance of maintaining a good understanding between those who are so intimately connected. It has been my aim to avoid the use of any language which could warrant angry feeling. What I desire is to see the links of their connexion riveted by justice. But I am well aware that these proposals come far short of other land schemes which have been propounded—far short even of what Parliament has actually done for Ireland. In my desire to keep well within the bounds of reason and moderation, I have asked less than might be justified by policy. Still I feel assured that, on the side of the farmers, the proposals which I recommend will, if frankly accorded, be accepted now with satisfaction, and even thankfulness. But if, in a matter which so directly affects the people's daily bread, an attempt should unfortunately be made to raise a barrier against the stream of opinion, the current cannot fail to accumulate, unless an adequate overflow be provided, till at last it shall burst the barrier, and then it may sweep away much that now could be preserved.

THE APPLICATION OF CHEMISTRY TO AGRICULTURE.

UNDER the well-known signature of "J. M.," we notice, in a northern contemporary, the following communication with reference to the important matters of he application of chemistry to agriculture. For many years "J. M." has taken great inerest in this subject, and has expressed his views about it, not only publicly in person, but through the press. His initials carry as much weight and influence as if his name had been written out in full. Although we annot quite agree in all that he says about hemists, we can certainly go a long way with him. The analyses by various chemists, we are bound to confess, appear to come out n their per-centages in a way not quite satisfactory to calm readers and practical workers. "J. M.'s" remarks are certainly such as all farmers must feel, although they do not give expression to them. He says, "Again, chemists are not well agreed as to the best formula or precise mode of expressing their analyses of manures. Compare many of those of Drs Voelcker and Anderson of the same manure, and this will be at once apparent." The following are "J. M.'s" remarks :—

> I am one of those who believe in the blessings to be expected from the search after truth in every department of human knowledge, even although the results of the search are not directly or immediately profitable. For instance, for how many years men of science wrought away with electro-magnetism, with very little apparently, for their labour. A few happy thoughts

of several parties applied the truths which had been discovered for the benefit of the human race, and now in the telegraph we have substantial proof of the triumph of science. I hold, therefore, that an experimental farm, though not affording immediately profitable results, may be the means of so adding to knowledge that in after years application of the discoveries made may produce most beneficial results. It has always occurred to me that had the views announced by the late Professor Johnston at the institution of the Chemistry Association been more closely followed, more fruit would have been gathered ere this. In the *Journal of Agriculture*, p. 10 (1843) he says—"The chemical officer, stored with all the available knowledge which geology, chemistry, physiology, and botany have yet supplied, will create among farmers more accurate, more precise, and more scientific principles, and the diffusion of unapplied knowledge on every part of rural economy will throw direct light on many of its parts;" that practical men would be instructed in the making of experiments, and to conduct them so as to make them satisfactory to scientific men, while the chemical officer would "interpret, compare, and generalize the results." Thus, by "putting questions prudently and quietly to Nature, so as she might be induced to solve them," a further result would be to make the manure manufacturer become to the farmer what the retail druggist is to the invalid—a mixer of ingredients of known composition, in known and prescribed proportions. That by such means "the chemist would become the recognized authority and friend of the farmer," and protect him from designing quacks as well as sanguine theorists, and keep him posted up, as it were, in every fresh application of the discoveries of observers in any part of the world which bore on his profession. The carrying out of this programme necessitates the chemist being in constant communication with farmers. Hitherto, this certainly has not been the case. It cannot be said that any progress has been made in ascertaining definitely the value of the various constituents which go to form manures as now supplied by direct experiment. Neither has the chemist of the society, or indeed any chemist in Scotland, fitted themselves to become the recognized authority to advise with and aid the farmer in compounding suitable manures for his soil and climate, or to assist him in preparing the most advantageous mixtures of food for his sheep and cattle. It cannot be said that the farmer has shewn indifference to be guided by the advice offered by other parties. At the same time, or shortly before that, Professor Johnston and other chemists took on themselves to be the counsellors of the farmers—a class of men sprung up offering their services for the purpose of buying and selling all sorts of live stock. They held that by constant practice and daily attendance at markets, the prices which they could obtain would be more in accordance with value than what the farmer could obtain. So also the grain agents and wool salesmen came before farmers at the same time. All these have been largely patronized, and not less so have been the manure merchants, as for 1 ton of chemical or artificial manures sold thirty years ago there are now 100. How comes it that the chemist, who was held up as "the recognized authority and friend of the farmer," has been far less successful in obtaining his confidence and support than of any of the parties above noted? Largely, I should should say because, he (the chemist) has not deserved it. Unlike the salesmen and agents, he never has given his whole time to the work, or by patient labour attained and added to his chemical knowledge the requisite practical acquaintance with agriculture. Again, chemists have not yet agreed as to the best formula or precise mode of expressing their analyses of manures. Compare many of those of Drs Voelcker and Anderson of the same manure, and this will be at once apparent. These different modes of stating or expressing analyses are most confusing and distracting to farmers, and encourage unfair dealers to mislead. Why should chemists who make analyses of articles for agricultural use not agree to a uniform mode of making and stating their analyses? In valuing manures each chemist has a plan of his own; some, when ammonia was selling low in the market, valued it higher, and now when it is high they value it lower. If any salesman of stock or wool had so worked for his employer, he would not have much employment.

The market value of an article must regulate the price, and I have heard that it is from the results obtained on experimental stations abroad with the use of sulphate of ammonia in growing beet and some other plants. Foreign farmers consider themselves justified in paying £24 per ton in this country for that material, besides several pounds more for transit and commission, and with an increased production of sulphate of ammonia from the various works. I am informed that in the hands of Edinburgh merchants there are about 1000 tons less in stock this year than last, the large foreign demand having cleared it away as made. Farmers in this country may depend that the experimental stations abroad, supported as they are by an educated and appreciative public, would not be continued except they were productive not only of fresh facts but also practical benefits, and the twenty-five stations which exist in such a country as Germany would soon cease to find support unless they were adding to the stores of knowledge and expiscating the principles of scientific agriculture.

The Garden.

LAYING OUT ROADS AND WALKS.

IT is one of the strange things of the political and social organization of our ountry, that when any city, town, or village as any park, public square, or cemetery laid out, the charge of it is almost always placed n the hands of some lawyers or prominent politicians—and the latter usually include the ormer. These gentlemen generally employ civil engineers or surveyors to do the necessary work for them; and not in more than one case in ten is any landscape gardener or any landscape painter consulted. The consequence is that no attempts are made to produce pleasing artistic effects by developing or bringing into prominence any specially beautiful view, by charming the eye with artistically-planted groups of shrubs, or by laying out the roads and walks in gentle undulations or soft and easy curves.

Surveyors and civil engineers are not generally men of any artistic feeling, for they have to do mainly with the rigid mathematical lines required in all purely mechanical works or operations. Beauty is an unnecessary element in laying down the line of a railroad or a turnpike, and receives no attention from them, the lines of gradients, curves, &c., necessary for the economical working of railroad trains being properly the matters most requiring their consideration. Hence it is that their practical education totally unfits them for works in which æsthetics are the main elements; and thus their continual failure in this respect in almost every work of the kind in which their services have been called in requisition.

In laying out roads and walks in a park or a country-seat, there appears to be a general prejudice against straight lines, and a general belief that a road to be handsome must be laid out in *wiggle-waggle* lines. Every endeavour is made to render the direction of such walks as tortuous as possible, without any reference to the contour of the ground, which, as in the case of city squares, is often a dead level. As, however, the natural course of a person going from one point to another is in a direct line between the two points, it follows that a road between the two points should be a straight line, unless some obstacle, natural or artificial, requires it to be deflected or deviated from; for it is a sound principle in taste, that as between the natural and the artificial, the former is to be preferred; and if the latter for any reason is adopted, it must be made to appear natural, or it will be in bad taste. If, therefore, in order to give greater length of road or walk for the purpose

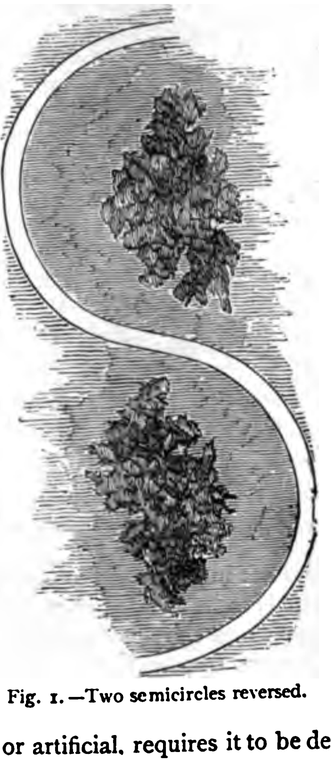

Fig. 1.—Two semicircles reversed.

of pedestrian exercise, or for making the area of a place appear larger or less contracted than it really is, a curved line of road is adopted, the reason for that curvature should be found in a group of trees or shrubs, or a swell of the land (artificially made, of course), that appears to require a deflection to avoid an ascending grade, or some building or similar object justifying the change of direction. A straight road should be made much wider in proportion than a curved one, in order to give it an appearance of grandeur, and should be planted on each side with trees in continuous rows, and not in groups. But a straight road or avenue is to be avoided when the swells or undulations of the ground line are sudden, or the departures from a level are very great. The ground line or level should in character conform as much as possible with that of the line of direction. A straight walk or road should, if possible, have some object in sight of special interest or beauty at its terminus; but in the case of such an avenue crossing a public square, this is not admissible.

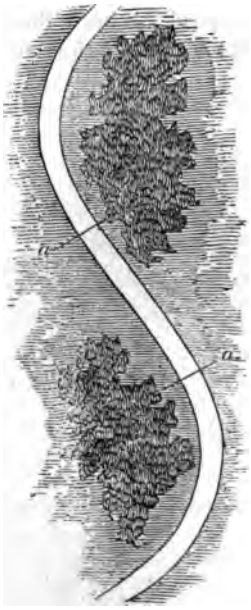

Fig. 2.—Two arcs joined by tangental lines.

When walks or roads are curved, the curvatures should be very gentle, and easily flowing into each other. For this reason, such lines as matter in motion follows sho adopted; such as the parabolic, the el the trajectory, and the cycloidal curves circle, or any portion of it, should ne used; for it is only a mathematical lin not a line of motion, for matter never in a circle unless artificially compelled so. Unfortunately, engineers and sur almost constantly use arcs of circles in out curved roads. Fig. 1 gives a co instance of engineer's work, reversin joining together two semicircles. F gives another instance of their style of out curved roads, where they join two of a circle by tangental lines, as at than which, in either case, nothing cou in worse taste. Fig. 3 gives an ex of the effect produced by adopting lin motion. The contour of the land a cultivated eye will indicate better tha mathematical formula the character o lines to be adopted; the great art bei blend the various curves together har ously without producing any straight congruous line at their junction. The

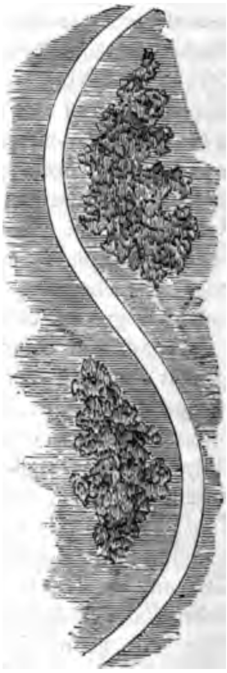

Fig. 3.—Walk with a flowing line.

of curved walks should partake of the cter of their lines of direction, and the ents should never be sharp or abrupt; he highest as well as the lowest parts e grades should be, if possible, about entre of the lateral curves. The undu- ns of the grade lines should flow into other softly and gently, and care should ad so to arrange the walks that neither lwelling nor any other building near by l be looked down upon. Sometimes an ption can be made to this when a wide ession exists between the two points of tion. No two roads or walks running e same direction should be seen from other, for then one of them appears to seless. They should be masked from other at such points of view by groups ees or shrubs, or swells of land. When d divides off into two branches, each ld take a positive outward turn, so as to appear as though they would not again come together.

If a walk has to terminate abruptly, there should always be some object at the termination, as though access to that object was the intention in having the walk. Such objects as a summer-house, a covered seat, a sun-dial, a statue, or an elegant vase, are suitable for this purpose. But the walk should return upon itself by means of a circular or other proper form of bed planted with choice shrubs or flowers, and should never end in a mere *cul-de-sac.* As a walk without any object in view would be simply an abortion, or at best a mere gymnastic training-ground, they should be very carefully laid out with reference to obtaining fine views, or as affording a sort of panoramic exhibition of objects of beauty, such as groups of elegant shrubs, or beds of beautiful flowers.—*James Hogg.*

NEW AND RARE PLANTS.

LISSOCHILOS HORSFALLII (BATEMAN).

'HE Lissochilos Horsfallii is an Orchid from Old Calabar. Its habit and ral appearance may be sufficiently ered from fig. 183. The sepals are green- n the outside, but of a purplish brown in- lly. The petals are white, suffused with The lip is nearly free, funnel-shaped he base, and slightly three-lobed; the al lobes very large, standing erect, green, ked with rich purplish crimson. The e lobe of a deep puce colour, with three sh elevated ridges on its disc. It is a strial pseudo-bulbous plant, producing a of several large plicated sharp leaves, the centre of which springs a handsome cape, twice the length of the leaves. It be treated as a warm terrestrial Orchid, lowers in October.

se terrestrial Orchids are—many of them at least—of great beauty. This one in question is one of the most distinct and ornamental of the whole terrestrial division of the Orchid family. It is not grown so largely as we desire to see it, and those, indeed, who have endeavoured to grow it have not by any means been successful. We attribute this more to the winter than to the summer treatment of the plant. Many keep watering these Old Calabar Orchids in winter as they would do in summer. This is a decided mistake, and a continuance of it, especially with plants that are not over well established, is almost certain death. Although of a pseudo-bulbous character, it is not decidedly so, growing more like the Phaius, which has groups of leaves coming from the ground not unlike the fashion of Bromeliads, to which we have already alluded. If the water rests in the sockets of these leaves, they to a certainty damp off, and scarcely any judicious treatment afterwards will save the affected plant. In all cases when water is given after the flowering period, say from November to February not a drop should be poured upon the leaves. It may be advisable to give the house in which a miscellaneous lot of Orchids is growing a washing with the syringe to knock off dust and filth, but it should only be done on the mornings of very bright days, under the influence of a brisk fire heat, the additional moisture will be licked up and discharged, as it ought to be, through the open ventilators. By attention to this, growers will have every success. The plant needs much water from February to September. Spare not, during that period, the water pot; and if the plant be established strong and healthy, it will reward the grower if he or she gives it, now and again, a little manure water.

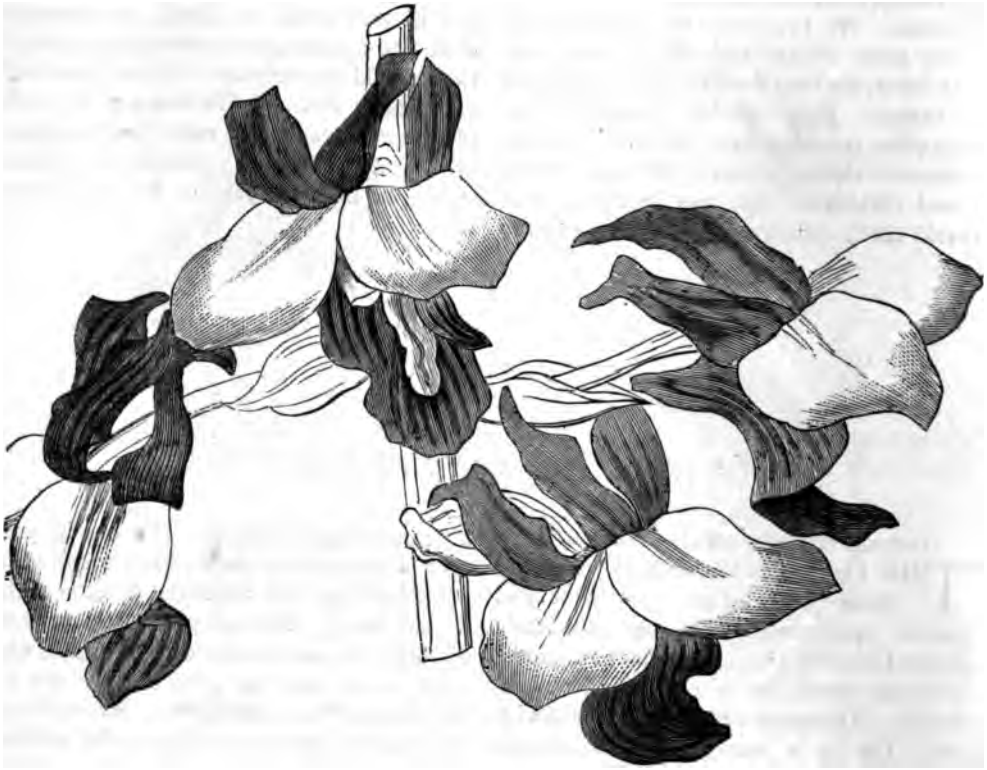

Fig. 1.--Lissochilus Horsfallii.

MANETTIA MICANS (PŒP. ET ENDLICH).

Hooker, in the "Botanical Magazine" (Feb. 1865, tab. 5495), gives a figure of this lovely climber, and characterizes it as by far the most beautiful species known to him. The flower is very bright light scarlet or red orange on the outside, and yellowish orange inside the mouth of the corolla. Fig. 2 represents the flowers of their natural size; fig. 3, a flowering branchlet reduced in size. It is from Peru, and was first made known by Pœppig and Endlicher in their "Nov. Gen. et Sp. Peruv.," v. iii. p. 24, as a native of the woods of Mayna, who state that it is a vigorous climber, extending some 20 feet. It has now been sent home by Mr Pearce, who collected in Peru for Messrs Veitch. He found it at Muna, at an elevation of 3000 to 4000 feet.

There have been a great many Manettias

oduced, particularly from Brazil, but ut the best that are usually cultivated in es, was the scarlet one from Trinidad— nettia coccinea. The one now figured is s showy one in colour than the Trinidad ies; it is of most prolific bloom. Fig.

3 shews a flowering branchlet reduced in size, but from the numerous flowers springing from the axil of each leaf towards the extremity of the shoots, the reader will readily judge how desirable the Peruvian species will be for its inflorescence. Again, fig. 2,

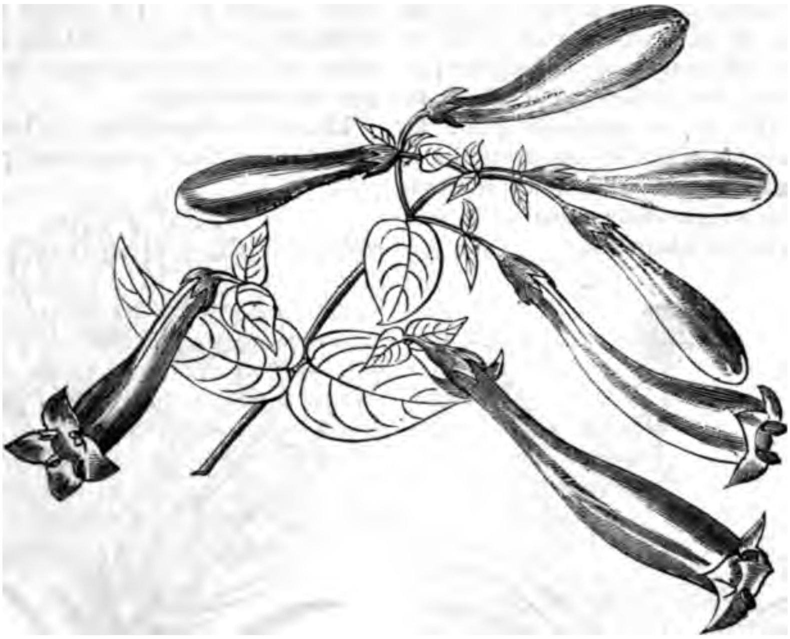

Fig. 2.—Manettia micans—Flowers and Buds natural size.

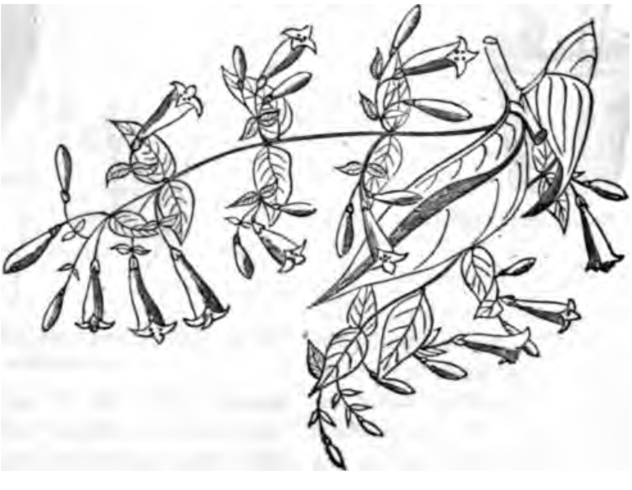

Fig. 3.—Manettia micans—Flowering branchlet reduced in size.

shews flower and bud natural size. It is, therefore, much the same size as the M. coccinea, and will form a good flowering companion for it. The soil in which it should be potted should be of an elastic character, full of fibre, and sufficiently sandy to keep the particles of soil from cohering too closely together. This is an admirable plant for training up the pillars of conservatories or greenhouses, for eventually forming festoons, which hang so gracefully down as to command no end of admiration.

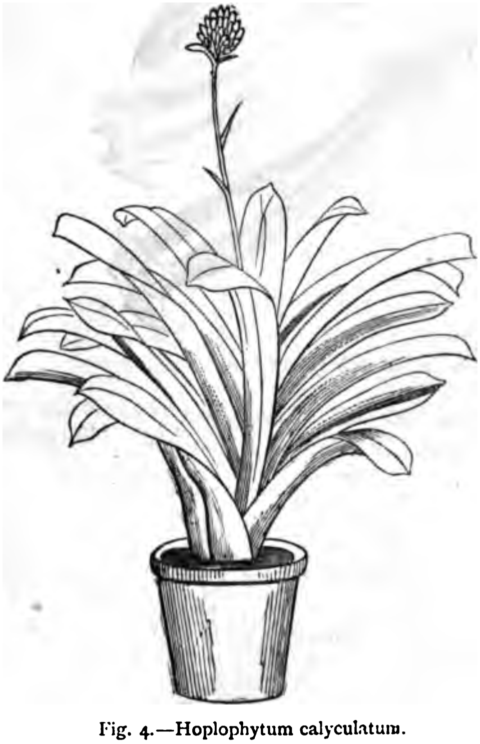

Fig. 4.—Hoplophytum calyculatum.

HOPLOPHYTUM CALYCULATUM.

This plant belongs to a section of the Bromeliads, established as a genus under the name Hoplophytum by M. Beer, of Vienna. The flowers are of a citron yellow colour, disposed in a crowded head. The figures which we have given are sufficient to enable any one to recognize the plant when they see it, at all events to distinguish it from all but closely allied species.

Fig. 4 shews the plant in a growing and flowering state, in what might be considered adult size. Fig. 5 shews the flower spike on an enlarged scale, where the bracts can be better judged of. The flowers are sessile, enveloped in the bracts; and like some of the others of the family, the bracts are pointed and somewhat bristly.

Like all the Bromeliads, it is better grown in under-sized than in large-sized pots. The material suited for it may be said to be a combination of fibrous yellow loam and peat, with a good sprinkling of sand to render the whole porous. It thrives well under the influence of a mild, moist heat, such as is generally found in the intermediate stoves of those who have large collections of plants. For

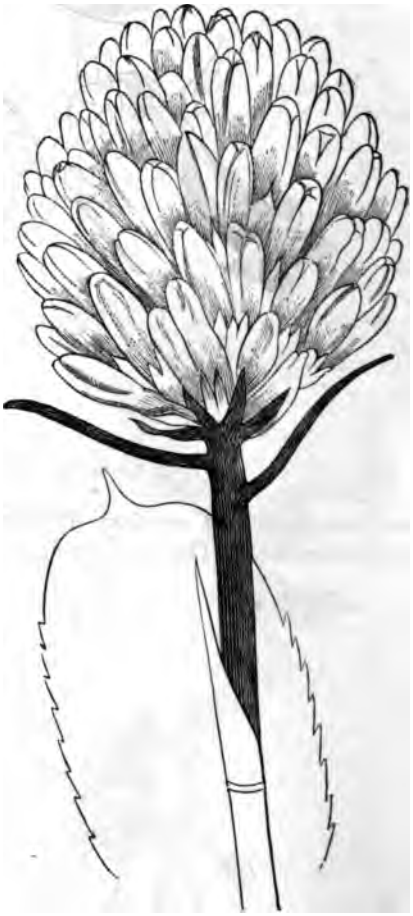

Fig. 5.—Hoplophytum calyculatum—Flower spike on an enlarged scale.

ıe-house grower it must be kept at the end, and if, perchance, there be severe er in winter, and the temperature low, it on the dry order; do not give it a drop of water until there come again a warmer day, and when it is watered, let it be in the morning, so that the soil in the pot may be partially dried before night sets in.

IEARS OR SECATEURS FOR ORCHARD OR PLANTATION.

HE season for pruning is now before us, and handy articles of pruning ry are in demand. They are now to be in such variety that it seems a work of :ulty to make a selection that would be for all purposes. Many there are that to the old tools of the days of their ı or apprenticeship—who seem almost led to them to the day of their death. ıis age of mechanical progress, it would that people of this kind stand very h in their own light. There is plenty :mployment for all who shew willingness ıe employed, and it is an object, or ought ɔe, with all, to accelerate work by dimi- ing labour as much as possible. Well, of the great economizers of labour about arden are pruning implements. If we : tall trees, that require their branches to shortened, or lopped off altogether, sup- ing we were trained to use the knife in our youth, it does not follow that we are to continue the practice if a readier better method be at hand. If we estimate the time occupied in carrying about tall steps and setting them down in convenient places for pruning by the hand, and even not in all cases being able to complete the pruning of the entire tree without climbing upon it and abrading its bark, we shall find that the costs more than it need be, and the labour has not been without certain injury to the tree itself. On the other hand, if we employ a secateur, or pruning shears, with spring, such as is shewn in our engraving, fig. 1, we shall have the tree pruned, the branches thinned out, before we have our steps possibly moved out of the first position in which they were placed. And then the manner of pruning is not hurtful to the tree, it does not shorten its life by a single day, or destroy its fruit-bearing or wood-producing qualities one iota. If that be the case, secateurs ought to be a portion of the garden cutlery of every villa and every other gardener. The spring gives force and rapidity to the simple mechanical action of opening and shutting, and the branches are lopped off dexterously, and even without the appearance of being mutilated or crushed. The French have gone a-head of us in this respect, they have dispensed with the knife in almost all orchards, and taken to one or other of the forms of secateur. Their secateurs are more mechanically efficient than those shewn in our engraving, in respect of their being wider set at the base of the shear blade, and their acting with corresponding greater force when applied in the act of cutting or severing shoots.

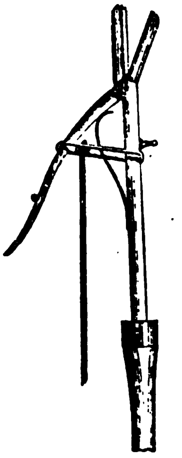

Fig. 1.—Shears for Orchard or Plantation.

SHEARS OR SECATEURS FOR GARDEN AND GREENHOUSE.

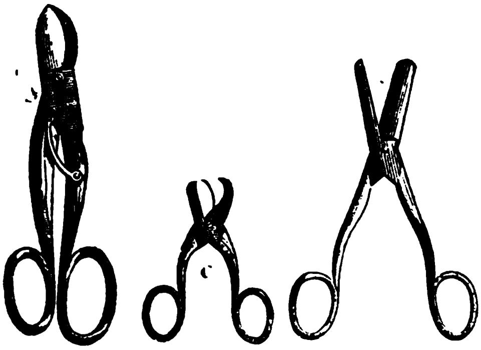

Fig. 1. Fig. 2. Fig. 3.
Shears for Garden and Greenhouse.

THE handy implements, three of which we have illustrated, should be the constant tools of either ladies or gentlemen. The largest one of those, fig. 1, is suitable for pruning any description of shrub, cutting out the dead wood or lopping off the living. It is a capital shrubbery secateur, and is a very powerful implement. The lesser sized ones are more ladies' tools. About a greenhouse, where pruning of decayed wood and decayed flower stems must have attention, these are the tools we would commen Any one can prune so much more dexterou among a lot of branches with this implement than with a knife, and they can do the work so much more speedily. They seldom get out of order, and don't require to be sharpened so often as a knife. They don't do all the pruning that should be done—the knife is still indispensable for soft wood and for smooth surface, but they do the drudgery description of pruning, and do it well.

Work in the Garden during February.

From "THE VILLA GARDENER."

THE VINERY.

he weather has been mild, a certain moist umpness will have been observed among the f the Vines. Silently and slowly, but surely, ve begun to grow. Were our ears attuned to unds, we might already have heard the gentle of the rising tide of life, and a rushing move- mong the scaly envelopes of the buds. They egun to throw off their winter robes, and to pre- ring fashions in which to greet the rising sun. r business to wait upon and assist this general ing of the powers of life, quietly and carefully , rather than force it on. Progress without ex- n must be our aim, and on no account must we fresh the old proverb, "the more haste, the less ' This is often the cruel fate that overtakes the amateur horticulturist. In a fit of enthusiasm vhipped on at express speed. It is so pleasant its progress, to see how much we can do, and on. But, alas, Nature will assuredly have her e. And swift and crushing, even unto death, enger too often is. By pushing the spurs of d moisture sharply into Vines or other plants, e of growth is tremendous, till exhaustion over- and then all is over. This impatience is as fatal to vegetable life, as to rush blindly down ine ending in a precipice, would be to ours. we would be refreshed, gladdened with rich sters by-and-by, let us move our Vines gently Coax them with our sympathy, excite them tears. In other words, enwrap them round gentle genial warmth of from 45 to 55 deg. an atmosphere they will grow, and carry their with them.

arm weather, change the air of the vinery daily eral hours' ventilation. At all times shut up se early, say about three o'clock. A penny s a penny earned, and the more of the sun's u can bottle away in your vinery early in the on, the less coal will be needed from your cellar . And the sun's heat not only is free of cost, oals are dear, but its warmth is better far for es than fire heat. This early closing is of im- importance in horticulture, but singularly it is difficult to render it popular with villa rs. I hope the new cries with which I would Vinery this year, of Close Early and Save your d Strengthen the Vines, may do something to ize the early closing of all plant houses.

THE ORCHARD HOUSE.

We might almost write ditto, ditto, or another of the same, here, only slower. Keep the embryo fruit, the flowers, under bud as long as possible. Hens that desert their chickens early are bad mothers, and seldom bring many chicks up to henhood. It is even so with precocious fruit buds. Those that open early, mostly perish early. Early birds gather the worms. But early buds mostly perish of cold. Our English springs are schools of patience, every one of them sent apparently to teach us the wisdom of waiting—a much higher wisdom often than that of mere working. This fickle playing at heat and cold, bids us be still and know that the warmth and beauty of spring life is coming. Waiting time should be a watching time. And we have need to watch and guard the trees against drought at the roots, ants, aphides, scale, and birds on the tops. Otherwise, our buds may drop or be devoured while they sleep. Excessive dryness at the roots now undermines the strong foundations of the buds, so that when life and sap ascend they are carried away by the flood. If you would keep these buds on and see them give place to embryo fruit by-and-by, see that the roots have water enough to keep them healthy, and to supply the whole plant with kindly nourishing moisture.

And as to prying insects, vaporize the wood and buds with Phytosmegma, or an infusion of Gishurst's Compound, 2 oz. to the gallon, applied with the showerer. They do not like this at all, the deadly vapour comes upon them so fine, and with such force as to pierce their jackets and make them turn up their eyes for the last time. And the birds abominate the vaporized buds. They burn their tongues, and tickle their throats so much that they whistle out, "No more orchard house, we thank you !" and then they fly empty away.

THE GLASS HOUSE.

As the season advances, the beauty here will increase. Where there are plenty of flowers out-of-doors in summer, the glass house ought to be in its greatest beauty for the first six months of the year. When all is bare boughs, and wrapped in ice outside, it is sweet to enter the glass house and breathe the air of spring, and find fresh flowers to welcome us.

Few things give this charm to the glass house so thoroughly as a few forced bulbs, such as Snowdrops, Crocuses, Narcissuses, Hyacinths ; also Violets, common Primroses, Chinese Primroses, early Forget-me-nots, and early Heaths; together with Hyemalis, Cytisus, Acacia, Armata, Epacris, Camellias, &c. The perfume of some, the look of all such flowers, fill the senses with harbingers and veritable realities of spring. Where convenience can be had for forcing other lots of spring flowering plants, such as Lilacs, Kalmias, Azaleas, &c., they will also mingle with the others. But in such cases, the glass house must be kept rather warmer, say from 50 to 55 deg.

But such tempting pictures of spring in February must be tantalizing to many. Their glass house is only a greenhouse, or hardly that—more of a storehouse and *omnium gatherum* of all plants, for rooms, windows, or gardens for next season, crammed to the door with cuttings of last year's roots, &c. Well, such a house is also full of interest. If there is little of beauty, it is brimful of the pleasures of hope. Those brown roots will be green enough betimes; those hard, dry-looking cuttings will grow into glorious beauty when the long days of summer return. Therefore take care of them, tend them carefully and lovingly, and you shall in no wise lose your reward. Let no cold under 40 deg. touch them, no drought wither, no insect fatten itself on their precious juices.

Place the tenderest, choicest plants, such as Show and Fancy Pelargoniums, in the choicest places where the sun will nourish their shoots into stoutness, that will develop glorious trusses of blossom in May or June.

See, too, that Fuchsias, breaking into new growth, have their eyes turned to the sun. Water the latter with care, till the shoots are fairly started. When these are about 1 inch long is the best stage for potting the plants. Carefully turn the ball out, pick away most of the old soil, and re-pot a plant which has been in a 12 inch pot into an 8 or 6 inch—a 6 inch into a 4 or a 3 inch—using a light, sandy soil, composed of two parts of turfy loam, one of peat, and a sprinkling of 1 inch bones and charcoal. Keep the plants in the warmest part of the house after potting, sprinkle them close overhead three times a-day, and see that neither the sun nor a draught of air makes them flag. In a week or fortnight, the roots will have taken a fresh hold of the new earth, and the plants are safe, and will require a final shift into their flowering pots, about the middle of March or first of April.

Heaths, *Epacris*, *Acacias*, *Cytisuses*, &c., in flower and full growth, will require liberal waterings. These may occupy the coolest parts of the house. No temperature above 35 deg. will hurt them, though it is safer to keep the glass house at a minimum of 40 deg. allowing 5 or 10 deg. rise when the sun shines.

Cuttings of flower garden stuff, such as *Verbenas*, *Argeratums*, *Petunias*, &c., keep as near the glass as possible. Should aphides appear, as they are likely to do, smoke them to death at once with Appleby's fumigator and prepared tobacco. This is certain death to all kinds of aphides, and a veritable boon and a real smoking-made-easy to the operator.

PITS AND FRAMES.

Hot Pits.—These will now be fully occupied. What with forcing bulbs and other flowers, and probably vegetables, such as Seakale, Asparagus, Rhubarb, and, it may be, striking cuttings and sowing seeds, and starting Cucumbers, February is mostly a busy time in this department. Where, as in most small gardens, the heat is kept up by fermenting materials, such as dung, tan, &c., there is likewise a good deal of risk to the uninitiated. For having to provide a bottom and surface heat from 60 deg. to 80 deg., it is not easy to say to the warm materials, "Thus far shalt thou go and no farther." And yet a little farther and all is lost. The great points are to sweeten the material well before use, and to err, if at all, on the cold side. For instance, Cucumbers grow best and grow fastest in a surface temperature of 70 deg. and a bottom heat of 80 deg. But rather than incur the risk of running the latter up to 90 deg., and the former to 80 deg., be content with an air heat of 65 deg., and a bottom heat of 70 deg., and so with other plants, &c. Keep a stock of hot dung and extra coverings at hand, so that should severe frost or cold winds set in, your pits and frames could at once be lined round with a hot wall of 18 inches or 3 feet thick of hot dung, and the surface of the glass be rendered proof against cold.

Keep forcing pits at a temperature of from 55 deg. to 65 deg., and water the plants with water of the same temperature, or from 5 deg. to 10 deg. hotter. Much evil is wrought, and much time and labour wasted by watering plants in hothouses or pits with cold water. This is simply pulling them back with the watering-pot, while urging them on with heat, and the result is disease, stoppage, or destruction.

Remove bulbs and plants, as they shew flower, to the glass house, cut all vegetables, &c., as they are fit, introduce fresh roots, put in or pot off cuttings. They will root rapidly at this season, and no shading will be needed, if they are plunged, say, 1 foot from the glass.

Cold Pits.—Exclude frost. Water with care. Beware of drip hitting the eyes of such plants as Pinks, Carnations, Auriculas. Give air every day, unless it is freezing. See that the plants are free of insects, dead leaves, moss on the surface of the pots, &c.

Cinerarias, *Calceolarias*, *Pelargoniums*, &c., may be shifted into their flowering pots, and kept at a temperature of 45 deg. until fresh rooted. Zonal Pelargoniums may also be shifted, and various annuals, such as Lobelia speciosa, Golden Feather, &c., sown. Many of these plants do best sown in cold frames, the seeds spring forth with a sturdiness which the plants preserve through life.

Potatoes, *Radishes*, *Carrots*, *&c.*—Protect from severe frost. Water when dry, and draw or use when fit.

THE FRUIT GARDEN.

Examine all fruit stores every week. One rotten fruit taints all we had almost written, and really ften as if it did. They never regain the same ss of flavour afterwards. This is a charming ion for the mistress of the house, or the master for that matter, when the weather bars him out arden. It is not very often, however, that this case. Here, for instance, is the wheeling of oil, or composts as top-dressings for the fruit r bushes, or Strawberry plants, during frosty r. Splendid exercise, of which it may be said oubtful which benefits most, the plants fed or ho carry their food to them. Of one thing our may rest assured that it is hardly possible to d bush fruit, Raspberries, or Strawberries. ow is the time to top-dress—the best mode of such plants.

es, *Pears*, and, indeed, most other fruit trees, h a fruitful habit is fixed, often require the help dressings also. When a tree becomes all fruit ortify it in this way, else, possibly, it may be ed from sheer fruit-bearing. Half a barrow- so of maiden loam or of juicy dung, is what weakly trees are crying out for through every ed branch. This surface feeding is just as l a part of high fruit culture as is root pruning, deed, it is often the essential corollary of the By root pruning we multiply fibres and fruit; dressing we feed the one and nourish the other e and maturity. See that all newly-planted e carefully mulched, and securely staked, thus two of their greatest foes, the biting frost and rupturing force of the wind.

ting.—Head back stocks for grafting. Lay in behind a north wall, and prepare clay, if this is d in preference to grafting wax or cement.

eed with the pruning, training, and nailing or f wall trees during suitable weather, and hasten perations forward.

e Apple and Pear trees, Gooseberry and Cur- &c., in garden or orchard, and point or scarify es or bush borders, clearing away all prun- d rubbish, and giving the whole a cared-for, pearance.

THE FLOWER GARDEN.

h all alterations, turf laying, planting, or new work, as speedily as possible. Turf laid this is apt to open into cracks during dry weather. t every bit of vacant ground is turned up to nents, that it may be enriched and pulverized; herbaceous borders are pointed and hoed ; that no weed is allowed to fatten at the ex- f the common flowers; and that spring beauties forth to greet us, find a clean and suitable or the display of their charms. The early ops, Anemones, Arabis, Aubrietias, Forget- , Daisies, Primroses, &c., seem as if they hether their owners love them or expect them, and behave accordingly, coming earlier and o very much better in some gardens than in others. Be it ours to place such early visitors on sunny banks, and in warm nooks and corners, to entice them into early blooming, and thus, as it were, anticipate the spring.

Choice Tulips, &c., protect from the severity of the weather, and see that mice and rats do not consume them. Crocuses, Hyacinths, and Narcissus are pretty safe from the ravages of such vermin, as are also Snowdrops and Anemones. But Tulips and Crocuses are sweet as beautiful; and even should the latter escape the mice, &c., the birds eat the flowers by wholesale, and the rabbits nibble them off level with the ground, while hares mow them down as with the sweeping scythe of death.

Roses.—Top-dress, finish planting, re-name, prune, beginning with the hardiest, and finishing towards the end of the month with the Perpetuals.

Clean shrubberies, roll and sweep lawns, turn, top-dress, and make new walks, lay fresh Box and other edgings. Sweep and roll old established walks and roads, and make every part of the flower garden as clean as "a new pin." One never tires of a garden well kept, though without a flower at all.

THE KITCHEN GARDEN.

Manure, dig, and trench every inch of vacant ground. Wheel on manure where it will be wanted in frosty weather.

Remove all dead and frosted vegetables; frequently examine Brocoli. Cut as soon as the flower is fairly formed. See that the crowns of late Celery and Globe Artichokes are protected from the frost, and that walks are cleaned, turned, or re-made, or top-dressed, if need be, and all work forwarded as much as possible, so that when the stress of cropping comes next month, no arrears of work may be left to divert or distract the attention.

Cropping, Peas.—Draw a little earth to those sown in November, and stake them more for the purpose of protection than aught else, and a wonderful protection the stakes afford. Another sowing should now be made of an early sort, and also of such Marrows as Ne Plus Ultra.

Broad Beans.—Sow twice during the month.

Onions.—This is one of the most important crops of the season. The ground ought to have been heavily manured and trenched, or roughly dug in the autumn, and wintered in this state. But better late than never; and if not thus prepared, it may yet be done. Choose the richest bit of ground in the garden, and give it the juiciest, strongest dung you have, and lay it up roughly at once. By-and-by smooth it down, and roll firm and top-dress with salt and soot, and sow the seed in drills 6 or 9 inches apart, at the end of the month or the beginning of March.

Leeks and *Shallots*, sow or plant.

Potatoes.—Plant the earliest varieties, on raised ridges running east and west, placing the sets on the south side of the ridge, about half way from the top.

Arboriculture.

JEWETT'S METHOD OF PLANTING TREES.

MR S. W. JEWETT, of California, gives the following as his method :—"A hole is dug in the shape of a bowl, rather larger than is necessary to admit the roots in their natural shape, the outer portion of which is supplied with a lining some 2 or 3 inches in thickness, composed of such materials as are known to be non-conductors of heat, such as decayed weeds, leaves, chips, partially decomposed sawdust, old straw from stacks, barn-yard mulch, &c.

"The soil should be left dishing around the tree, forming a basin for water, and a thick covering of mulch, composed of similar materials with which the hole is lined, should be spread over all. Irrigating water passes through this mulch, and soon reaches all the roots by the non-heat conductive lining.

"This method applies to those soils and localities which, by long continued heat and drought of the summer, become parched, hot and dry, as most of the valleys, prairies, and agricultural lands of the State do, and hence are not as well adapted to the growing of trees, shrubs, and Vines, under the old established and common practice of transplanting. The advantages to be gained by following out this method are at least four-fold.

"Moisture is retained around the tree three or four times as long, and consequently a proportionably less amount of irrigation is necessary. The land does not dry up and bake on the surface and downwards, thus preventing water from entering and settling immediately around the roots. Six times the quantity of water may be taken up in the same space of time, the mulch lining of the hole conveying it directly around the roots. The heat of the earth, outside the lining, is checked from penetrating the earth enclosed, and hence the application of a less quantity of water will satisfy the plant.

"For common trees, holes are sunk in the earth from 2 to 3 feet in depth, and the same in diameter, more or less, according to the size of the tree to be set, several pails of water should be poured into the space, where the earth is removed, before the tree is set, especially if the soil is dry, and many more soon after the work is completed. If the tree carries a heavy top, it should be braced thoroughly, to prevent any motion of the roots during high winds. In hot and dry soils, the roots should be settled deep into the earth.

"This system of transplanting trees, and also shrubs and Vines, is peculiar to myself; if others have practised it, I know nothing of it. It is well worthy of trial by gardeners. This mode of operation secures the tree from injury by protracted droughts, and is the auxiliary in collecting moisture and retaining it. It also operates as a cut off to heat, and a check to high temperature."

The Stable.

HORSE-SHOEING.*

the preface of the work before us, we are informed it is not the object of the "to make every owner his own horse- , but to instruct farriers. Further, the t is to enable the public to appreciate the ; a technical branch of industry, and to it its bearings upon the national wel-

e author could, probably, have not ed more powerful reasons for writing)ok, for farriers need sound instruction. class, they display profound ignorance details of their every-day occupation, re surprisingly opposed to every other iple than that of having their own way that relates to a horse's foot, and the er in which it should be defended. In natter, Mr Gamgee comes to the front, by an amount of practical experience has fallen to the lot of very few men profession. At home and abroad, for ime, the practice of horse-shoeing and of the principles by which it is or ought directed, have been his constant occu- , and we believe no one possesses a ardent desire for the progress of his sion, particularly that branch he repre- in its usefulness in the great social my.

at, as a nation, we pay too little atten- o this (horse-shoeing), and its allied hes, which actively minister to the ng up of our colossal fortunes, has proved over and over again. Mr ee adds another gigantic stone to the superstructure of errors of omission and commission, which prevents that fortune being larger and raised more speedily. While whole sessions of parliamentary duties are absolutely thrown away on party questions alone, no attention or encouragement is given to those which, of a scientific or learned character, are a thousand times more useful and profitable. They are left to struggle as best they may, with the little private enterprise that can be brought to bear upon them, and thus dwindle into subjects of opinion upon which the owner of a donkey feels as confident to offer his ideas as the professional man himself. But with such vaunted knowledge no progress is made, and hence the author finds ample materials for proof of the fact, which he gives in a manner that is beyond all cavil.

Commencing at page 180, with the statement of Professor Sewell, who, returning from the Continent, after going thither to collect information on the state of Veterinary Science, averred he had seen more lame horses while posting from Harwich to London, than he had met with throughout his tour in France, Switzerland, Germany, and Belgium, the author states what he has himself seen. After repeated observations made in different parts of the most busy streets of London and Edinburgh, those mentioned by Professor Sewell are more than confirmed. More than 42 per cent. are palpably lame, and this fact we know applies to most of the large towns of the United Kingdom; while in Paris, where, like all other Continental cities, the art of farriery has received State patronage and support, only 9 per cent. of lame horses were detected in similar observations. The fact is significant, and

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Horse-Shoeing and Lameness. By Joseph e, Veterinary Surgeon, formerly Lecturer on nciples and Practice of Farriery in the New ary College, Edinburgh. London: Longmans, & Co.

worthy of note by those who presume to direct the nation's welfare through its intellectuality and technics—at its best in the present moment, it is a monumental disgrace, and unless more solid information is encouraged in and disseminated by our schools, we may not hope for better things.

Notwithstanding the amount of error pervading the works of previous writers against which the author declaims, his own does not prove entirely free. At page 40, he stumbles upon the hackneyed statement that the angle of the wall of the hoof is 45 deg. Previous writers have fallen into this error, by their proneness to accept an assertion without proving its verity. Our experience proves that the degree of obliquity in many—we may say the majority of well-formed feet, is much higher—50 deg. and upwards—therefore, to perpetuate such, is tantamount to placing a serious error before those he wishes to instruct.

At page 60, reference for further information is made to "the chapter on 'Action,'" which we have failed to find.

At page 90, *et seq.*, heavy shoes evidently find favour with the author, and at page 138, on the subject of "cutting," he is silent as to their being one of the greatest causes among the hard-worked horses of this country.

Among the illustrations of nails, at page 142, preference is given to some, which from their superiority of form, are said to be "Scotch;" and others of inferior shape are described as "English." We think this buying the question, particularly as we know that the very form of nail Mr Gamgee gives in his illustrations, has been long common to the manufacturers of Belper, Chesterfield, Rotherham, and the villages in the vicinity of those towns. The form of a horse nail depends much upon the price paid per thousand. Well drawn nails are as common as "bull necks" but competition in the obtaining and execution of work, has led to barbarism in this as in other branches of industry.

Upon the subject of special causes of lameness, the author is scarcely at home. In his scrupulous care for the hoof, he totally ignores the principle of giving exit to imprisoned matter within, preferring to allow it to ascend and pass out at the coronet. Mr Gamgee's experience may be unquestionable in this respect, but as a practical objection we urge that we are not partial to the keeping of animals under needless suffering, besides jeopardising so much tissue and incurring loss of the hoof, while hesitating to remove a small portion at the bottom. If not opposed to the principles of surgery and common sense, the recommendation is at least singular. Although that there is much we dissent from, there is a great deal with which we agree, and feel assured that the reader of Mr Gamgee's work may find many points upon which very useful ideas are communicated. His illustrations throughout are excellent, and calculated to throw much light upon the intimate connexion that exists between the foot, so called, and the phalanges above.

We are disposed to believe that a little less dogmatism would aid the object of the work, and more lenient allusions to the writings of others on the same subject, enhance its force and authority.

DRIVING TROTTING HORSES.

TROTTING stock and trotting for money and amusement, are now more popular than ever, and it is highly important, both on the ground of humanity, and in order to enable the animal to attain the highest degree of speed and endurance, that he should be handled and driven in an intelligent skilful manner. There is too much useless cruelty practised on these noble animals, and it is no sufficient excuse to assert that, in many cases, this harsh treatment is the result of thoughtlessness, or ignorance of their structure

;, or habits. No person has any right, *r*, to train or handle horses without previously acquired information as to :s points, peculiarities, and development. ting horse requires a different confor- ı to that of a running horse, and their ide difference in the modes of treat- required to develop the qualities of ls for different purposes.

some cases, says the *American Stock ıl*, the whip must be used, but it should be brought into play when the horse ıot know what it is for. A clap with ıip, which almost makes the colt jump f the harness, is often immediately fol- by a powerful snatch on the reins to im back again. Both of these are as ; bad can be. Sore mouths, bad temp- nd broken gaits, are almost inevitable ; of such handling. On the other hand, colt has been well broken, and has a lively mouth, and the driver handles ins skilfully and thoughtfully, the colt ıon understand every move of the hand, ı answer it. From this it follows that ıught to make no move with the bit ıt a definite object. When you feel an ;e to do something with the reins with- ıowing what you are to do it for, don't ıll. Such moves only fool the horse. body admits that a very hard pulling is a nuisance; and everybody knows ome will pull if they are to trot, and ot exert themselves without a strong even in regard to these, it is not well to up a steady, rigid pull all the time. rather pull for a space, and then ease ot suddenly, but gradually, by this they will not pull quite so hard, and ɔt faster. It is not natural for a horse . hard. Some there are, of uncommon and determination, that will pull in .ny; but more are made hard-pullers ılty handling when young, which has ıed their mouths.

ırder that a fast horse should be under .stances to do his best, he should be as ıt ease in his harness and general rig ;ible. If he is not, he is placed at al- s much disadvantage as if sore or stiff, or suffering from some bodily ailment. You may see horses brought out of the stables to trot with a very tight check to keep their heads up, and a tight martingale to keep it down. Such a horse is in irons, and when to this is added a dead drag at the reins, and no movement of the bit from end to end, I cannot see how he can do his best.

People talk about a steady, bracing pull; but, in my opinion, that is not the way to drive a trotter. There is a great difference letting go off your horse's head, and keeping one dull, deadening pull all the time. The race-horse riders practise what is called a bracing pull, and, a great many times, I have seen their horses tire under it without even running their best. The steady pull checked them. The pull should be sufficient to feel the mouth, and give some support and assistance, so as to give the horse confidence to get up to his stride. More than that, is mis chievous. To keep the mouth alive, the bit must be shifted a little occasionally. But this is not to be done by a pull of the hand on the rein. A mere half-turn of the wrist, or less than a half-turn, by which the thumb is elevated and the little finger lowered, is sufficient to shift the bit, keep the mouth sensitive, and rouse the horse.

The reins are to be steadily held with both hands while this play with the wrist is made; and it is, of course, only to be done with one wrist at a time. The hands should be well down, and the driver ought not to sit all in a heap, with his head forward. Neither should he lean back, with his bodily weight on the reins, which, in that case, are made a sort of a stay for him.

He should be upright; and what pulling he must do should be done by the muscular force of the arms. The head and the arms are what a good driver uses, but some have their arms straight out, and pull by means of putting the dead weight of their bodies on the reins. If, instead of lying back, and putting their bodily weight on the reins, with which latter they take a turn round their hands, drivers would depend upon their muscular strength, they would let up on the pull, graduate it instantaneously.

The Dairy and Poultry-Yard.

FRESH EGGS ALL THE YEAR ROUND.

DR TRIMBLE, entomologist, of New Jersey, has favoured us with some notes of his process in bringing about the agreeable result indicated in the head-line of this article. Sandwiched are some side hints and suggestions to owners of acres and fathers of sons.

It should be premised that the doctor lives in the suburbs of a city. Hence his experience will be especially helpful to others who are in the cabined and confined quarters which such proximity is understood to indicate.

Early last December he bought in the market fourteen hens and two roosters. They cost 12 dol., were of several breeds and all sizes, from Bantam to Brahma. Up to April 12, besides the scraps from the kitchen, he had fed 3 bushels of corn, 1 bushel of wheat, 3 pecks of cracked corn, 1 peck of buck-wheat, and a small portion occasionally of what is called "scrap-cake," the whole costing 6 dol. 75 cents. On the other side—eggs, in December, 37; January, 80; February, 87; March, 117; and twelve days in April, 80; makingin all 401, or more than 33 dozen.

These fowls had been kept in coops some time before they came into his possession, and were in bad condition, requiring two or three weeks to recruit. He would not again buy in the market, but would go to the country—invade the harem of some careful housewife.

The doctor's feathered friends have had the run of the garden, and free access to an unoccupied barn. The floor of the stables in which they were cosily cuddled during the very cold days was well covered with fine hay, and the sides of the building lined with bundles of corn-fodder? In more clement weather, and especially as the snow began to disappear, much of each day was passed in the garden, picking green food, particularly *chickweed*, and to this chickweed he ascribes much of his success. Sometimes, to test their fondness for this green vegetable food, he would keep them confined until near night, and they would continue feeding upon it so late as to be unable to find their usual roosting-perches. Persons, says the doctor, who are annoyed with this troublesome weed, have only to give the poultry a chance at it. Last fall his garden was matted all over like the fleece of a long-woolled sheep, and as the snow melted it was found in blossom. Now, there is none to be seen. Hens are equally fond of spinach—they will also spoil your strawberry-beds.

He tried cabbage-leaves several times, but when there was no snow on the ground, they would not touch them, preferring to pasture in the garden.

The doctor has no faith in keeping poultry penned up. In addition to grain as the substantial food, they want both vegetables and insects, and nothing pleases them better than the privilege of ranging where they choose in pursuit of these luxuries.

Fresh water was given every day—in cold weather it was made lukewarm, and when liable to freeze was given often. These sixteen would often drink a quart within an hour in the morning. Oyster shells, broken up fine, were always within reach. A large shallow box with ashes, another with dry earth, were provided for them to dust or wash themselves in.

The doctor believes that hens that have been accustomed to taking care of themselves old-fashioned style, finding their own and roosting in trees all the year round, e more likely to reward you for such kind nent than such as have lived in luxury. other winter he intends to try some of Hamburgs. They are very beautiful, aid to be good layers; they have not elligerent propensities of the game, nor iperabundance of comb and gills of the breeds, nor the great size and sluggish- of the Cochins and Brahmas. For eggs nter, he would choose year-old hens.

e setting propensity is easily controlled. days and nights in a coal cellar, with y of food, is sufficient. Placing them ter, so that they have to sit standing, h unnecessary and cruel; neither would rn the barn over their heads, as they the State of Maine. Those who do vish to raise chickens, should, in his on, select the Polands or Hamburgs— that procrastinate incubation until ma- age—partaking, to some extent, the e of the cuckoo or cow-bunting among smaller birds, leaving the future of the race to foster-mothers.

Most boys have a fondness for pets, which it is well to encourage. Let the little fellows have poultry, if only Bantams. I know, says the doctor, a gentleman living in Brooklyn, who loaned his little sons the capital to buy quite a stock of hens; they managed so well as to be able to return the loan at the end of the first year, and at the end of the second they had money of their own. The gentleman himself took from their stock all the chickens and eggs required for his family at the market price. Those boys have a pleasant employment, and are learning a lesson in money-making, to be useful in after life.

A person who carried off between forty and fifty of the honours at the recent poultry exhibition in New York is a mere youth, and has other employment beside the care of his poultry. His father has told me that if he choose, he could support an extravagant family on the profit of the poultry business alone.—*Hearth and Home.*

LARGE TURKEYS AND TURKEY BREEDING.

PASSION for extra size is one of the weaknesses of the American mind. In cisions given at our fairs, weight is not an important item, but the one thing ul. In a scale of one hundred points, t would be the equivalent of fifty in ninds of most judges. It is the big , the big pumpkin, and the largest fat hat take the premium. Economy of ing, or the process of production, is m inquired after. The same bad taste is to affect the decisions in our poultry s, unless the managers insist upon a wholesome standard. A large, well oped bird, of maximum size, is desir- A monster is not for any conceivable se, except to excite wonder and draw owd. We raise poultry chiefly for the table. What the producer wants in his stock is good quality of flesh, early maturity, and capacity to make the most flesh out of a given amount of food. A turkey, weighing 15 lb., is just as good for the table as one weighing 30 lb.; and most housekeepers would prefer them under 12 lb. In most markets the lighter weights would bring the higher price. It is only in the region of large hotels and boarding-houses that the very large birds bring an extra price. For what object, then, do we want large breeding birds, and how large do we want them? It takes about three years for a turkey to attain its largest weight. If at twelve months a gobbler reach 30 lb. live weight, at two years he would reach 35 lb., and at three years 40 lb., or a little more. But it is rare to get a male bird above 40 lb., and then it is generally by some process of stuffing, that destroys his stamina and oftentimes his life. This weight is excelled sometimes; but about the time one thinks he is almost sure of a 34-pounder, the prodigy sickens and dies. It may be assumed, then, that 40 lb. is about the limit to which a vigorous turkey-cock may be safely carried, and from half to two-thirds of that weight is the last safe limit for the hens. With breeders of this size, and a little under, we should get large strong chicks, that will economize food, and mature earlier than the offspring of common-sized birds. No bird yields more quickly to treatment than the turkey. The influence of a large-sized gobbler in a flock is immediately visible in the increased size of the chicks. The introduction of wild blood increases the hardiness of the young. A larger proportion of the eggs will hatch, and a much larger number of young will be likely to grow up. With a little care it is easy to breed to any shade of plumage.—*American Agriculturist.*

FOWL WITH MATCHLESS LEGS.

A SINGULAR fowl (says Mr W. B. Tegetmeier, in the *Field*) was forwarded to me a few days since by the kindness of Mr Henry Cheffins, who has furnished me with the following account:—"A game cock was given me last year, and turned down in my poultry yard, where I had a moderately-bred lot of Dorking hens, to which, by-the by, it was not intended he should have access. The eggs were set as usual, and one of the birds hatched shews such distinctive marks of both breeds, especially in the legs, that I send it to you." Upon examination I find the bird to be coloured like a black-red game cock. The legs, however, are both with the additional Dorking toe, and what is exceedingly remarkable is, that one leg (tarsus) and foot is perfectly white, the other deep bright blue. The appearance of the bird is very singular; it strongly reminds the spectator of the dress of the old servitors, half blue, half yellow, the legs being of different colours. I think the case sufficiently interesting to put upon record. I may also mention, that on two occasions lately, I have seen examples of pigeons, red on one side and blue chequered on the other; this arrangement of colours produced a very singular effect.

DARK BRAHMAS.

MR JAMES LONG has commenced a work which promises to be a valuable addition to a department of husbandry which farmers in this country have much neglected, if we may judge from the annual expenditure upon foreign eggs. It is entitled "Poultry for Prizes and Profit." We have received the first part, which treats of 'Breeding Poultry for Prizes." We extract the following about Dark Brahmas, and have to acknowledge the courtesey of the Publishers, for the engraving we give:—

The difficulties met with in the selection of Dark Brahmas for breeding purposes are, perhaps, more numerous than in any other variety. It is essential to success to produce pullets of good colour and distinct pencilling, but the great difficulty of ascertaining the strain and blood of the cock makes this task by no

y. In establishing a strain it is well to select t number of birds to prevent the necessity of .t purchases, and, perhaps, consequent im- of bad blood. Three breeding pens, or even and half-a-dozen hens, are sufficient to con- out a cross for years, as the strong constitution ıma renders a cross of related birds by no means ıble if not continued. Select well-shaped, hed, hardy cocks of two years—not neces- e; see that they have first-rate combs, clear fine handsome heads, full hackles, bright s, and, if possible, even unbroken tails—such ›se possessed by Favourite and Young Samp-

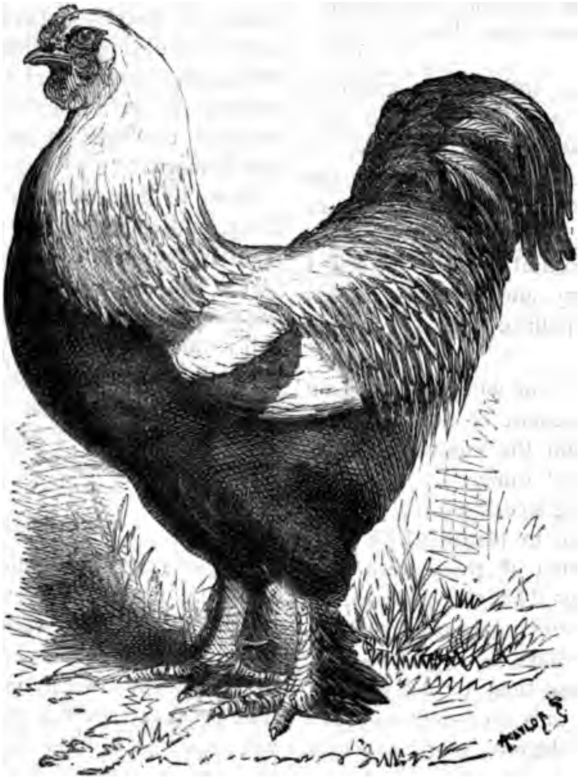
:ree from white. For obtaining heavy leg :an strongly recommend the use of a vulture- :k, but the hens must be without a suspicion e fault. Some of the heaviest feathering we 'as obtained in this manner. We have tried ; with great success, having, perhaps, only el in a brood throwing after his sire.

is a point that must be selected by the if he prefer the silver grey the cock must :k breast and thighs, the hackle and saddle sely striped with black, the base of the the tail coverts being simply laced with a narrow white edging. Avoid brown feathers and a tail of purple reflections, these belong to the brown strain, and are fatal to the production of good silver grey pullets. The hen should be dark—even darker than her required progeny—and very well and distinctly pencilled.

For breeding brown pullets the cock may have a slightly mottled breast, if the hen is very dark, and brown feathers in moderation. The hen had better be perfectly pencilled, especially on the breast, unless the cock can be depended upon as bred from a well-pencilled strain, when his "blood" will balance his mate's deficiencies; but, in any case, the hen must be fairly pencilled. It will be found much simpler to produce well-pencilled brown pullets than silver greys, probably from the more subtle qualities of the latter.

If, in purchasing a bird, the seller is unable to furnish any information as to the qualities of its parents and race, it is well to trace the immediate ancestors; and, as far as possible, ascertain their colour and principal characteristics.

For size, large hens are preferable to large cocks; if the former are broad, deep, heavily feathered in thigh, with full rising cushion, the cock may be small, and in a measure, scant of body feathers.



Dark Brahma Cock.

The Country Gentlewoman.

THE PARLOUR GARDENER.

CHAPTER XII.

FRUITS UPON THE TERRACE.

ruits that we can have on the Terrace.—Strawberries—Grapes—Cherry Trees—Plum Trees—Currants—Raspberries.

WHO is not a little of an epicure? Epicurism and idleness—the love of those pastimes often called *idle*—are the east of the seven mortal sins; as to the others I will say nothing, being averse to dealing in scandal. A little gluttony as regards fruits is so natural! As to myself, I cannot honestly deny, and therefore frankly confess, that I sympathise with our mother Eve.

The fruits, however, of which I am about o speak, have the merit of not being forbidden; they are, on the contrary, among he most admissible of things.

Now, you are going to ask me if I pretend o make you engage in planting fruit trees on your terrace, such as there were, perhaps, in those famous "hanging gardens" of Queen Semiramis; which gardens, by-the-by, supposing them to have ever existed, were nothing more nor less than terrace gardens, such as your own; only, in a degree—never mind what precise degree—more spacious. I have no such grand enterprise to propose o you, ladies; no scheme of the sort is in my mind. I desire merely to call your attention to a small number of excellent fruits, of which you can easily have a harvest—I do not promise that it shall be large enough to oad a ship—upon your terrace.

In the first place, then, an assumption on my part. I assume that your terrace is sufficiently spacious to admit of your border boxes being large enough to afford room for he worship of Pomona, as well as that already appropriated to Flora; and this without the least encroachment upon the rights of the lady last named. This pretty little figure of speech—a perfect statuette, is it not?—is not original with me: I beg you to understand, ladies, that I lay no claim to its authorship; it belongs to the late Rousselon, and first appeared in his "Annals of Flora and Pomona."

Now, to descend from the airy heights of fancy, and engage in our work upon material realities, you will find that a few Strawberry plants will not be at all in the way of your ornamental ones. And this being the case, will it not be pleasant to you, while engaged in your horticultural labours, to find now and then, under your hand, a fine, ripe Strawberry or two? And these of your own production!

STRAWBERRIES.

If you open the catalogue of a horticulturist by profession, you will be frightened at the innumerable varieties of the Strawberry; each variety asserted by the vendors to be perfect; whilst, in point of fact, the fruit produced by the greater part of them will prove to be either flavourless or sour; or, in fine, with some defect or other, rendering it not worth cultivating. I, who am very cautious on this score, and who, as the result of long experience, generally eschew all such—can safely recommend to you, as among the most desirable, the old-fashioned Alpine, which is a monthly bearer, and the British Queen. This last is noted for its extraordinary fecundity. It is of the Strawberry, mind you, that I state this. You will recollect that plants—plants exclusively—constitute the subject of our present dis-

; and you must not let your thoughts ff into other fields.

adopting these varieties, and planting nd there among your flowers a couple of of each of those I have previously d, you will enjoy the exceedingly fine r of them, one by one, as they suc- ely ripen; and as the climax to the plea- ou will have been experiencing all the in watching their growth in ripening. spects the latter point, great self-control ur part is indispensable. I warn you beforehand; for if, through impatience, ather them too soon, even so much as gle day too soon, you will lose by it, I e you. Their flavour cannot do justice own merits at any point short of the perfect maturity. Your Strawberry s will require no other attention than f taking off the runners by which they gate themselves. As to water, they ake care of themselves, drinking their rom the supplies placed within their in watering the other plants. You remember to renew them every two , by means of runners that you will re- for the purpose. To preserve these dust and soot, it is necessary that they vered with hand-glasses.

GRAPE VINE.

r some years past the Vine has been a deal cultivated in pots, in order that it be *forced*—that is, be compelled to pro- long before the time when it will be ced in the open air. This *forcing* con- simply in cultivating the Vine in a hot- , or tempered greenhouse. Buy Vines, u can, all trimmed and ready for bear- nd place the pots containing them at ot of the posts supporting the arches ur terrace arbour. They will there find table support in the situation the most rable. Train them so as to make them in festoons. In due time Grapes will ere, within reach of your hand, hanging nches, all the way from the base of the s up to where the vases are suspended e centre of the arches.

ill not this be charming?

TRIMMING AND THINNING.

Two things are indispensable to make your Grapes as good as they ought to be—to cut off the top of the Vine, which must be done as soon as its young Grapes are formed, and as large as a Pea, and to thin out the Grapes when too thick in the bunch.

This last operation is as follows:—When the Vine grows in good earth, in a good exposure, and has been skilfully pruned, and when too much fruit—too many bunches—has not been left upon it, each blossom will produce its fruit. As they expand, the young Grapes crowd each other; they get squeezed together, and pressed out of shape; the air and light can get only to those on the outside of the bunch. The consequence is, that the bunch has not half the value that it would have, had the matter been differently managed. Do you know, ladies, what, in order to avoid this misfortune, is done by the wives and daughters of the gardeners of Thomery? Thomery is a little village where those unrivalled Grapes are produced, which are sold at Paris under the name of "Grapes of Fontainebleau." These women, each armed with a pair of pointed scissors, patiently cut out, from each of those little bunches of which every distinct bunch is composed, one young Grape in every three. And this is the way I now advise you to treat all bunches produced by the Vines on your terrace.

You will, I acknowledge, have but four Vines growing in so many pots, and you may perhaps fancy that the produce, however good in quality, must needs be insignificant in quantity. Let us, then, make a little calculation. Arithmetic, you see, will thrust itself into all human affairs, horticulture not excepted. Well, then, each one of your four distinct Vines will have four main branches (that are cut down short, say to about 6 inches in length); from each one of these branches there will be two running Vines, and each one of these running Vines will bear two bunches of Grapes. If all turns out well, as you have reason to hope, you will then have to gather, in September or October, how many bunches? Why, if arithmetic be a reliable prophet, you will have no less than sixty-four bunches of Grapes. Is not this number large enough to warrant your inviting, if not all your acquaintances, yet at least the whole circle of your most intimate friends, to aid you in the joyous labours of your vintage? One drawback, certainly, is that they will not possess much flavour, except that of soot, in the midst of a large city; but as you will grow them more for beauty of appearance than eating, this will not much signify.

THINNING OUT THE LEAVES.

About a month before vintage time you will have to perform upon your Vines a chirurgical operation, which requires considerable judgment in execution. By the French it is called *epamprer*, which signifies to unleaf; consisting, as it does, in taking off such leaves as prevent the sun from striking directly on the Grapes, which solar action is indispensable to their being gilded with their proper rich yellowish hue, and to their possessing that richness of flavour of which this hue is the only guarantee. If the bestowing of all these attentions upon your Vines be not an amusement for you, then—permit me to say it—you do not deserve to enjoy them.

CHERRY TREES, PLUM TREES, CURRANT BUSHES, RASPBERRIES.

Are Strawberries and Grapes all the fruits that you can have on your terrace? No, certainly. There are beautiful dwarf trees, about the culture of which I am going to give you some hints, which, if you profit by them, will enable you to have, in addition, Cherries and Plums; and your variety of terrace garden fruits may be further increased by adding to these dwarf trees a couple of Currant bushes—a white and a red—and three or four Raspberry plants. The dwarf Cherries and Plums, cultivated in large pots, or in boxes, will bloom perfectly on the terrace. You can purchase them all prepared. They will "load heavily," as the French gardeners say, and it will be a lively satisfaction to you to gather their ripe fruits some time before the usual time of their ripening; or, placed on the terrace, they are in the best of situations for enabling them to work energetically, and force their fruits forward to early maturity.

FORCED DWARF FRUIT TREES.

Is it your desire to have ripe Cherries and Plums? If this be your wish, it is very easily gratified. About a fortnight after their leaves have fallen in autumn, remove your dwarf fruit trees (which I suppose to be in pots) from the terrace into the house. They will soon begin again to vegetate, and by January or February they will be in bloom, which, of itself, will be very agreeable to you; and they will ripen their fruits a month or two before those in the open air. To enable them to do this, the only assistance they require from you is to be placed near the windows, and to be turned every day, so that each side may receive its share of light, and to have the air they breathe kept up to a constant temperature of from 62 deg. to 63 deg. of Fahrenheit's thermometer. This will be about the temperature of your room; the one at which it would be kept as being the most pleasant to yourself, and the best for your health, as well as comfort; so that you will not be put to any additional expense, nor have to derange your habits in any way for the sake of these dwarf fruit-bearing pets of yours.

You see now that fruits, no less than flowers, have their part to play on your terrace, although the principal part appertains to the flowers. When you receive your friends, will it not be very pleasant to have Cherries, and Currants, and Raspberries to offer them, at a season when they are great rarities in the market? Will not your guests be delighted to assist you in gathering these nice fruits from the tree with their own hands? And, when placed upon your table, as its central ornament, will they not look far more beautiful than if they had been bought with money?

PRUNING FRUIT TREES ON THE TERRACE.

Don't trouble yourselves about pruning your dwarf Cherries and Plums. The gardeners have a saying that these trees, whose wood always contains a great deal of o not "love the knife;" they ought, re, to have it applied to them as sel- possible. As seldom as possible is o often; in a word, so far as they are ned, keep your pruning knife in your gardener's tool-chest; they will thrive better for its being left there—be all ore productive.

Raspberries, which are simple shrubs, heir own way of vegetating; they are pe- l in their roots only. The annual stalk, aving borne its fruit, dies in autumn; ought then to be cut down level with rth in the pots. The root puts forth year, in great superfluity, young shoots, are destined to bear fruit the following and, of these shoots, but three only be allowed to remain on each plant— to say, if you wish to have a good crop ly fine Raspberries. In the spring, cut ut a-quarter from the length of these reserved shoots; the buds at the middle of the stalk will now develop better than if it had been left entire; and it is from these buds always that the finest of the fruit invariably comes.

Currants require only to be freed from the old wood—that is to say, the exhausted branches, which will no longer bloom, and which with their tops supported on a single stalk, encumber the inside of the bush. By their being trimmed in this manner, the fruit will come out at a good height, far enough from the earth not to be soiled by the spattering of earthy particles during heavy showers and watering; this, therefore, is the best way of trimming Currants on the terrace.

Now, ladies, I hope you will agree that the culture of fruits on your terrace, if you keep them in their proper place, has its merit as well as that of the flowers.

DRIED AND PRESERVED FLOWERS.

IE perishability of flowers is a great hindrance to their more general use icles of personal adornment, or for decorations. Many times are miser- counterfeits of silk, cambric, and *paper* uted for the real presentment, because he most hardy soon wither when sub- to much handling, or to a close at- ere. And then flowers cost so much, blossom represents a great deal of nd money, even if we raise them our- —that few persons can afford the in- ice very often of such short-lived orna- If, like pictures, they held up their faces week after week, and month nonth, with no diminution of their at- ns, the expense would not deserve a nt's thought. But when, beside this, cur the sadness of witnessing their decay, we are apt to reflect a good while putting them to such use.

wers, we all know, do not sequester their charms for the sole benefit of the individual who possesses them, even during their brief existence; so when, on extraordinary occasions, by dint of economy in these matters, we do gratify our companions as well as self by surroundings of floral beauty, we would fain retain a souvenir of the event, as many a heap of shrivelled and brown petals, just ready to drop to dust, that once were fresh and fair, hoarded carefully among valued relics, can attest. Again, when love and friendship find most fitting expression through the voiceless lips of flowers, how relucantly they are yielded to decay—how much is done to lengthen to the utmost their fleeting lives; and when all traces of life have left them, how, like so many mummies, they lie in their lonely sarcophagus—the time-stained and tattered letters that accompanied them. And when the Myrtles and white Lilies of death that have lain in the ice-cold hand, now mouldering under the

Daisies, made sacred by that touch, have been reverently rescued from the grave for a few brief days, how jealously are they guarded from harm, with what affectionate solicitude—almost as if they were the embodiment of the departed—expedients are resorted to for setting far-off their final relinquishment to the fate of all earthly things!

But this iron law that, governing mortality, has laid its rigorous hand so heavily on the floral world, may, in a measure, be set at defiance; just in the prime of their loveliness, bud and blossom, leaf and tendril, can be so changed in tissue, and yet retain their original appearance and individuality, as to be in a certain sense incapable of decay.

Flowers prepared in this way are [in great request for floral decorations of all sorts on the Continent; and the fashion is already on the rise in this country, which we see in the shops of florists, the greater portion being procured from Erfurt, in Germany. The preparation of these is neither an expensive nor a difficult process. Any lady will find it an agreeable diversion, as fascinating as painting, and less unhealthy; while the cost of materials, not counting the price of the flowers, is trifling.

The first method of preserving flowers is by preparing them to present a flat surface, with their colours undimmed, resembling a painting. This has been a favourite style of making funeral wreaths and bouquets durable mementoes of bereavement; and, until the last few years, the only method practised in this country. Dried in this manner, flowers are employed in Europe for many purposes of ornamentation. One favourite form is that of a lady's fan, to be used at the theatre, or in the ball-room; when not in hand, to decorate the chimney-piece. The flowers upon this are preserved in a flat position, and are fixed with gum tragacanth to the material of the fan. The best material to arrange dried flowers on is card-board. It may be covered with silver paper, or delicate black or white lace, according to fancy. To this the flowers are gummed in any design; this fan simulates a bouquet. Green leaves, except those of the Laurel family, lose some of their brightness even with the best management, and, unless resort is made to artificial tinting of their surface, cannot be used with preserved flowers. Hence, Lycopodium and moss, that retain their briliancy so long, are the verdure most frequently introduced, as little as possible being admissible. The design completed should be set in a dark airy room to dry for a day or two; then lace of the same sort that lies beneath the flowers must be spread over them and gummed at the edges; a neat edging of the same, or a small silk fringe, being affixed in the same manner, as a finish.

The requisites for drying flowers to present this uniformly flat surface, are a quantity of clean white paper, light and soft, with an undressed face (the kind known as botanical drying paper being the best), two covers of wire cloth (sheets 2 feet long and 1½ feet wide, their edges bound with a narrow strip of zinc), two stout leather straps with buckles, a paper knife, or a small wooden spatula, and a camel's hair pencil.

The flowers must be freshly gathered; buds and half-blown blossoms are best. When wide-open flowers are used, it must be in the first hours of the expansion. A thick bed of smooth layers of the paper must be made, resting upon one of the covers. For small flowers, ½ inch deep of the layers is sufficient; for Roses, Japonicas, and other large and double flowers and their buds, 1 inch will be needed; this is to absorb the moisture. Upon this bed lay the flowers, without crowding, in a natural position, using the paper knife and hair pencil to arrange the petals, the sepals and the stamens and pistils, with great care. If possible, none but flowers of similar size and appearance should occupy these drying sheets at once; never admit but one colour at a time, else there is danger of dimness or discoloration. When all are smoothly arranged, lay a bed of the same thickness of paper upon them, place the other cover, and make all tight and firm by means of the straps and their buckles. Suspend this in the sun and air—out-of-doors is best; if in a light breeze, the drying is hastened. The smaller flowers will dry in eight hours of summer sunshine. The often require two days. They should e removed from the drying sheets till e moisture has left them. Then take carefully with the paper knife or spatula lean sheet of stiff white paper, and keep dust and moisture till they can be ght into the intended design. The e of the design should be drawn in l upon the card-board it is to occupy. n this, brush lightly gum tragacanth of nsistence of mucilage. Place the flowers on, and gently touch them here and with the tip of a dry camel's hair brush fix them. Put no gum upon the flowers e leaves, or other verdure that accomes them; the gum must only be applied e card-board. When glazed and framed, floral designs make handsome cabinet res.

Ladies' Head-dress formed of Flowers.

owers dried in the fulness and symmetry tural form, with their colours as brilliant hen living, are available for all sorts of mentation; for the most experienced can scarcely detect the least difference een them and freshly gathered blossoms. ll their flowing lines of grace, leaflet and bud curving and drooping as when attached to the parent stalk, they may be seen from the accompanying engraving, where, with crystallized grasses commingling their lustre, an elegant *coiffure*—ladies' head-dress—is represented. It is a very tasteful and becoming affair, designed for evening full dress.

The articles needed for drying flowers in their natural form without being pressed flat, are river, lake, or sea sand (this is called white sand, it is sometimes of a bluish grey tint), a wire sieve with a wooden cover to fit its base, a paper knife, and a camel's hair pencil. The flowers for this method of preservation, as for flat drying, must be freshly plucked, and without dew or any other dampness. Everything about this work must be thoroughly clean. The sand must be rubbed and rinsed in clean water till the water flowing through it is as clear as that from a well. Then put it in clean crockery dishes to dry. It must be perfectly dry and just blood-warm when the flowers occupy it.

When the sand is of the right temperature close the cover over the base of the sieve and pour it in till it fills the whole space beneath the wire-cloth. Place the flowers in an upright or natural position, by inserting their stems in the apertures of the wire-cloth till they rest firmly in this sand below. Do not crowd them, nor, if sprays or panicles are dried, let the flowers overlap each other to injure their form. Fold a sheet of stiff white paper to make a cone-shaped funnel, and pour the warm sand through this around and under and within the flowers. The cone should be folded to give the smallest possible stream of sand, and it must be poured with great care and gentleness, especially within and among Heliotrope florets, and the Heaths and other small flowers. It is a slow and careful operation. Within the bells of Mahonia, among the Spireas, Deutzias, Acacias, Verbenas, Lantanas, Bouvardias, and the like, special attention must be given to cause the sand in falling to fill all vacancies and to support every portion of the flower correctly. The sepals and corolla of Fuchsias require nice management, or, rather, patience enough to allow time to pour the sand properly. Roses also must have particular pains given to preserving the curves of their petals; sometimes the edge of the paper knife or the tip of the hair pencil is needed to hold or raise them while the sand is poured under and upon them to effect this. After filling in and under and around the flowers, sand must be sifted over them, warm, to the depth of ½ inch. Then set the sieve where it will keep the temperature of 70 deg. steadily, till the flowers are dry. The smallest flowers will dry in six hours; but the large autumn sorts, with thick petals, require ten, twelve, or more to get thoroughly dried. For this reason, those of about the same texture and size should occupy the sieve at one time. When it is reasonable to suppose that the flowers are dry, take the cover from the base of the sieve, and the sand will fall through the wires, leaving them as perfect in form as those in a fresh bouquet, their colours as fair and bright as when placed in the sieve, yet dry and rigid. Leaves should be dried entirely by themselves, the thin and delicate sorts alone, because they are soon dried; and the thicker ones also require to be treated separate from others. The foliage of the Myrtles and Laurels give the best satisfaction; the more flexible and succulent species lose some colour and often need to be superseded by moss or Lycopodium.

When both flowers and leaves are dry, they may be clustered and tied like fresh ones in garlands, crosses, bouquets, or any other device; and as they need no moisture to keep them in fair and life-like appearance, are very desirable as funeral decorations. In forming hand bouquets of dried flowers, some of the grasses may be used to lend their airy grace to the group, such as the Brizas and Airas. A fall of lace paper to finish the setting gives elegance to this form of bouquet, which would serve admirably for a vase, as well as for the hand. Baskets of flowers dried in this manner are very effective, hanging in an arched doorway or window; and nothing more beautiful can be designed for the dinner-table than an epergne filled with an assortment of these flowers tastefully arranged; while as wall-decorations, bouquets or wreaths composed of a handsome variety, well contrasted, gummed to card-board, and then glazed and framed, lend a summer-like aspect to any apartment, and are a perpetual delight.

Preserved flowers, properly speaking, are sheet dried flowers coated with wax, stearine, or paraffine. They closely resemble wax-work, but are less expensive. Of course, the talent that is required for success in making wax flowers is not needed for this work; only a certain tact and skill, gained almost wholly by experience, in manipulating the flowers, and in using the coating material.

When flowers are to be preserved, they must first be dried in warm sand as directed above. Then melt white wax, stearine, or paraffine—paraffine is preferable—to a fluid state, in a clean bowl, which rests in boiling water. Keep the water hot over a spirit-lamp, gas-jet, or the stove, and then the fluid will be in right condition. Have the flowers conveniently near, in a flat dish, on which they can lie while the calyx and under part of their corolla is coated; apply the melted paraffine with a camel's hair pencil, with light careful touches and strokes. When these portions are nicely covered—just as little as possible of the coating must be used, yet all must be covered—take the flower by its stem in your left hand, and with the pencil drop the liquid paraffine in and about the various divisions, letting it flow as it will, but not enough to obliterate the finer parts; and then with quick, gentle touches finish the remainder of the flower. Proceed in the same way with the buds and the leaves. When the colour of the leaves is unsatisfactory, some persons colour a little paraffine with Paris green, and coat them with that. There is danger of making flowers and leaves too clumsy if the paraffine is not in a fluid state. Be sure to guard against this; and take care not to dim or hide the colours by too liberal applications of the fluid; there is less danger of this with paraffine than with wax, because it is of a much more transparent nature.—*Anna G. Hole.*

THE COUNTRY GENTLEMEN'S MAGAZINE

MARCH 1872

A LORD ON LABOUR.

AT a meeting of the North Herefordshire and South Shropshire Agricultural Labourers' Improvement Society, held at Brampton Brian, Herefordshire, Lord Edmond Fitzmaurice, M.P. for Calne, presided, and delivered a long speech on the objects of the society, and the condition generally of the agricultural labourer.

His lordship commenced by saying that his first duty was to assure the labourers present of the great interest with which he had listened to the speeches which the meeting ad heard. The objects of the society which hey had formed were five. They asked, in he first place, that the cottages which they ented should be so rented not from the farer or the employer of labour, but direct from he landlord himself. They asked, in the econd place, that the labourer should receive etter wages than he did at present, and also at those wages should be paid in money, and ot, as now, partly in money and partly in ind; or, as was said in some parts of Engnd, partly in "truck." They asked also that e allotment system which existed to such an normous extent in some parts of England, nd which had proved a source of such nmixed benefit to the labourer where dopted, should be, to say the least, extended o Herefordshire also. They asked that the llotment system, in addition to that narrow nd technical sense in which the words enerally speaking were understood, should e extended to giving them, or rather to allowing them to rent sufficient grass land on which to keep a cow. They, finally, wished themselves to promote emigration.

EMIGRATION: COTTAGE ACCOMODATION.

After mentioning, in connexion with the latter subject, that to his own knowledge some sixty labourers and their families, through the efforts of a Wiltshire clergyman, emigrated a short time since to Canada, all of whom, with a solitary exception, had succeeded admirably, the noble lord went on to remark that emigration seemed to him to be one of the most valuable, perhaps the most valuable, aids that existed for the agricultural labourer; far more useful in his behalf than migration to the north of England, where their employment would be new to them and where the demand for labour fluctuated very much. Passing on to deal more particularly with the "home" part of his subject, he had been told by the agent for one of the largest estates in the south of England that he never intended to let cottages with the farms again as long has he lived, and he added, as his reason for this determination, that he considered that to let the cottages with the farms was to run the risk of turning the agricultural labourer into a serf. Alluding to the subject of cottage accommodation in general, Lord Fitzmaurice remarked that a great deal of abuse was showered on landowners for not building better cottages; but he had come to the conclusion that the opinion expressed by good authorities of the badness of the cottage accommodation was chiefly, if not entirely, due to the operation of the laws relating to the settlement of land. Disclaiming that he spoke of this subject politically, he insisted that the landowners, if they were only alive to their own interests, would go in against those laws, which injured their interests, and, through injuring their interests, injured those also of the farmers.

ALLOTMENTS FOR THE LABOURER.

Coming to the allotment system, he said from his own experience he knew that it had been not only of great benefit to the agricultural labourer, but was also very much appreciated by him. Then, intimately connected with the allotment system was a subject which for the last three years had often engaged the attention of Parliament, and that was the enclosure of commons. During the last session of Parliament an Enclosure Bill was introduced by the Government. It was not treated at all as a party question; it was referred to a Select Committee, of which he was himself a member, composed, as all such committees were, of members in equal proportion from either side of the House; and he was bound to say the Bill was discussed in a fair and equitable spirit by all parties. That Act, however, for want of time, was not passed, but he hoped that it would be this session; and, if so, it would be found that in that Act the interests of the poor were not disregarded as they had been in the several Acts passed between the years 1710 and 1845. The chief feature in the Bill in question was, he might mention, that upon any enclosure being made on the award of the Enclosure Commissioners, one-tenth part of the common-land so enclosed would, when above 500 acres, be devoted to allotments for the labouring poor—or instead of being set out for cultivation it might be set out as pasture for the cattle of the allottees. He found, on reference to the Report of the Commissioners, that the grass-for-a-cow system had been carried out for a number of years with the most satisfactory results in Derbyshire. On nearly all the large estates in that county, including that of the Duke of Devonshire, what was called "the cow-grass system" was carried out to a great extent. It was worked in this way: the landowner, or, perhaps, the farmer, allowed the labourers to turn out their cattle for six months in the year on the pasture, on the payment of a certain small sum per head, besides which they were each allowed to rent a small piece for the rest of the year. This system was found to work remarkably well.

LABOUR HOURS: EDUCATION.

He did not wish to express any opinion as to whether nine hours, or ten hours, or nine hours and a-half, or what particular number of hours, was the precise limit during which agricultural labourers ought to work; but what he thought was perfectly clear was that they ought not to be kept working all hours of the day, and possibly the night, and perhaps Sunday into the bargain. It was probable that the labourer, without sacrificing his own legitimate interests, would be able to work a greater number of hours per day than the town mechanic, for the reason that while the latter had in most cases to work in an unwholesome atmosphere, the agricultural labourer had at least the advantage of being employed in the fresh open air. One of the preceding speakers had alluded to the subject of education. He had travelled with a view specially to studying the educational institutions of different countries, those more particularly of Germany; he had talked to schoolmasters, clergymen, and persons of all classes; and he might say that the result was to shew him that the people of those countries looked down upon England with a feeling of scorn on account of the miserable condition of the agricultural labourers in our country. In America and in Canada, the labourer was an educated man, and therefore the English labourer when he emigrated had to compete at a great disadvantage with the native workman. But the remedy lay within the scope of the labourers themselves. Let them bring their influence to bear on their Parliamentary representatives; let them, as far as they could, turn the "screw" on a bit, and tell them that they wanted to give their children a good educa-

He denied that if it were ordered that :hildren should go to school the agri- l labourers would rise in rebellion. ; very true that in many cases the er received small aids to his wages e earnings of his children, but after e had heard that evening, he did not r of making the labourer understand the supply of infant labour were cut e result would be to raise the rate of paid to those who were grown up. s precisely the same in its effects as tion. If a large amount of labour aughted out of the country, that which ft, from being more scarce, necessarily realized a higher rate. And the same might be said of women's labour. Apart from this view of the matter, an educated labourer would earn more than an uneducated workman, and therefore if the children were given a better education, when they grew up they would be able to earn higher wages. In conclusion, Lord Fitzmaurice dwelt upon the advantages to agricultural labourers of associating themselves in some sound friendly society, advised the founding of an emigration fund by this society, expressed his sympathy with the agricultural labourers, and his earnest hope that those efforts might be crowned with success.

THE SUPPLY OF HORSES.

ʼON this subject, about which there has been a considerable amount of sion of late, "a landlord" has the ing sensible remarks in the *Field*, in o another writer, who suggested that rds, instead of breeding cattle, should hunters for themselves and for the t. He says:—Their answer usually is the breeding of horses is unsatis- y;" and the cause of their answer is hat though you may select your mare our sire with the greatest care, you can- epend upon the produce being of the hich you wish to see. In the first place, horoughbred horses are not as a rule t carriers. Sir G. Cholmondeley's horse, us, was one of the most powerful ighbreds ever seen, but even he was to 16 stone, therefore you must fall pon half-bred mares; and a perfectly d mare of this stamp, even if put to a tly shaped thoroughbred sire, will not uently throw a worthless foal, because tter will cast back to some ancestor of ionable form. Moreover, even perfect re liable to so many accidents from irth that the rearing of them becomes, ive already said, unsatisfactory. The summer may be dry, and the pasture bad, or the mare a bad nurse, either of which may cause the animal to be stunted in its growth. Then, again, there are innumerable accidents to which young horses are liable, and which I will not bore you by recounting, but which combine to make the breeding of horses unsatisfactory.

The farmers say "horse breeding does not pay," and to illustrate this part of my subject I will give an example. A farmer breeds ten oxen and ten colts. When they are three years old he sells the whole at £30 each. The oxen are killed and eaten, and there is an end of them, and his customer comes to him for some more. They have reimbursed the breeder the amount that he has expended upon them, and that is all, but they have produced very valuable manure, and their dams have produced milk and butter, and he never hears any more about them, and is satisfied.

The colts go away also. They have just repaid the cost of their keep, but their manure is of no great value, and the dam's milk is good only for the foal. In a month's time three of them are returned—one a roarer, another spavined, another incurably vicious—and the customer and breeder look shyly at one another, and the latter determines to "stick to beasts." Possibly, one or two of the remaining seven may be sold at a very high figure, but the profit does not go into the pocket of the breeder, nor would he complain of this provided he was sure of the profit that he had legitimately gained; but he is not sure of it, because the law of warranty is against him! Therefore my first suggestion is, let the law of warranty be repealed, and let every purchaser be bound by the opinion of a veterinary surgeon given at the time of sale.

Mr Tattersall advocates a Government breeding establishment for army purposes; and many people think that thoroughbred mares of no value for racing purposes might, if put to strong roadster sires, produce a very useful cavalry nag.

I beg leave to make another suggestion. Between Woking and Farnborough there is a large tract of poor land not worth cultivating, but which would feed mules suitable for army transport. Let Government take some of this tract on lease. Let them purchase a certain number of thoroughbred or well-bred mares, and import a certain number of Spanish stallion asses. The produce would be mules, which would live where horses would die, and which would do an immense amount of work. They are very much used in the south of France and in Spain. The mares are tethered in a field of clover or grass as long as the young are sucking, by which means the forage is economized, and when weaned, they take their chance on the mountains; and though I don't mean to say they are as pleasant to deal with as horses, they are at all events cheaper and more hardy.

TENANT-RIGHT IN ENGLAND.[*]

By Professor WRIGHTSON, Cirencester College.

TENANT-RIGHT has been too often discussed to allow of my coming before you armed with new arguments. Such is not my intention; neither, I venture to say, is it what you expect. The Government of this country, and, as more immediately affecting a meeting of farmers, the landlords of this country, are in a great measure ruled by public opinion, and it is as guiding public opinion that such meetings as the present are valuable. Would that the farmers of this country better understood the value of their individual and united opinions! How often are members of Parliament influenced in their views by contact with well-informed farmers? How often are game bills, local taxation bills, contagious (animals') acts, modified by the motions of agricultural associations such as this? I think it necessary to remind you of this fact, because the great mass of farmers are not yet roused to a sense of the importance of united effort. The position of the tenant-farmers no doubt has its bright side, but I venture to assert that it has sad drawbacks which not only affect the men who occupy it but the community at large. It is not my object to-day to open up all the difficulties which beset the farmer in developing his business to the utmost of his knowledge and means. We have to do with one of them only, which may be expressed as follows:—An enterprising farmer may lay out hundreds or thousands of pounds in cleaning, fertilizing, draining, and otherwise improving his land. Several years may elapse, during which time the business has been carried on at a loss or very small profit, and yet the grateful land is ready to give back with interest the capital already incorporated with it. It is exactly at this point that the need of tenant-right makes itself evident. The tenant may die, leaving a wife ung children, who must speedily quit. ndlord may be succeeded by a needy, , or unprincipled person, who at once ds to raise rents or eject tenants; al difficulties, game disputes, and of- of various kinds may arise, any of which ficient, at a six months' notice, to sever nnexion between landlord and tenant, xcept in certain favoured localities, the inate tenant is robbed much in propor- ; his occupation has been improved by nagement. The position of the tenant- is the reverse of satisfactory in all this. be summed up in the word "insecure." nglish rural economy in which the land ied by one class, farmed by a second, tually tilled by a third, has resulted in nest farming in the world. Whatever tical reasons may be urged against this ablished system, let us be careful how nge it for new-fangled notions, which not be found suitable to our national tution. England is nearly all let to s, and cultivation is brought to the t perfection upon large farms and upon estates. The immense mass of food ced annually in this England is pro- by tenants, and I maintain that what- shackles the farmers of this country shes the food supply. £10 and £12 cre, and even larger sums (Mr Mechi £15) may be profitably expended in ry farming business. This is equal to one-third to one-fourth of the entire of the land, and yet look at the legis- enactments for protecting the landlords, ontrast them with the helpless legal city of the tenant. "I recently read r," says Mr Mechi, "before the Mid- Counties Farmers' Club, at Birmingham, I met the most wealthy, intelligent, nterprising farmers of an extensive t. In the discussion which followed, painful to me to hear from every r that the want of security of tenure aluation for improvements sat upon ike a heavy cloud." The same feeling ls throughout the country, and demands ost serious attention. We have, indeed, to this point. Knowledge and wealth have increased, new improvements have been invented, new means for increasing the fertility of the land have been discovered, stock has been improved, and yet the old relations between landlords and tenants are tenaciously preserved. I say it is impossible to apply the knowledge now possessed by farmers unless they are secured from loss by a lease, a comprehensive tenant-right, or, better still, a combination of both.

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[*] Read before the Hexham Farmers' Club.

WHAT TENANT-RIGHT REALLY IS.

I have read almost everything that has been said upon this subject of tenant-right within the last two or three years, and have been much struck with the unanimity of opinion which exists with regard to it. Landlords and tenants appear to be agreed as to the principle of compensation, and, while it is by no means uncommon to hear men of experience declaim against leases, it is rare to hear this other means of security condemned. We have next to consider what tenant-right really is, to strip it of its ambiguities, and finally to see whether any practical basis of action can be fixed upon in order to accelerate its more general adoption. Firstly, we must not confound English with Irish tenant-right. The Irish tenant not only requires payment for improvements, but for the "good-will" of giving up possession. Such a tenant-right not only locks up the capital of a young tenant commencing business and diminishes the rental value of the land, but it can hardly be supposed in any sense to develop agriculture. Neither must we use that ambiguous expression "custom of the country" as quite tantamount to this right. Tenant-right might be, and to some extent has been, grafted upon the "customs" of various districts, but too often the customs do little more than protect the way-going tenant from loss upon any necessary labour he might have performed for the benefit of the incomer. I can not, however, agree with Mr Corbet in maintaining a strict and definite distinction between customs and tenant-right. I rather view the customs as the existing machinery by which improved ideas as to tenant-right are to be carried out. Neither do I think that we have reason to be altogether depressed with regard to the progress of tenant-right. The principle has been granted by every leading agriculturist, namely, that the tenant's capital should be made secure upon his leaving his occupation. It is also desirable that a way-going tenant should have sufficient inducements to farm well up to the end of his tenancy. I would also urge that in advocating tenant-right, which is essentially the payment by the landlord for improvements made by the tenant, we are bound to allow that, in case the farm can be shewn to have been damaged during the occupancy, the tenant should be equally willing to reimburse the landlord for such damage.

ENGLISH COUNTY CUSTOMS.

The exact state of tenant-right throughout the country has been too little investigated. Lincolnshire tenant-right is in every one's mouth, and it no doubt is the oldest and probably the most perfect system in existence in this country. This right is, however, incorporated in the customs of the county, and can only be viewed as an extension of them in a direction according with modern improvements. With regard to other counties we have, in some cases, a liberal way-going crop with an allowance in addition. In Monmouth the out-going tenant takes an away-going crop of wheat on one-third or one-fourth of the arable land, and has liberty to sell clover, hay, straw, and roots. Usually when a way-going crop is allowed, it appears to stand in the place of other ordinary allowances. In Derbyshire, there is a limited compensation; bones, lime, guano, rape dust, &c., are allowed for. The allowances for ½-inch bones extends over six years on grass land when pastured; if mown, for three years; on some farms one-third or one-half of the cost of the oil-cakes consumed during the last year is allowed. In Huntingdonshire, the allowance for lime is in equal proportion over four years; one-third is allowed for linseed cake or other artificial food used the year before quitting. The out-going tenant is allowed for carriage on materials for building, and on drainage tiles, and also five years in equal proportions for drain
In Kent, Surrey, and Sussex, the amount t
paid to out-going tenants has been complai
of as excessive. In Leicestershire
Rutlandshire, in a Michaelmas entry, the
comer pays for all acts of husbandry, bo
manures and their carriage, and one y
rent and rates on the summer fallows.
has to take the root crop at consuming pri
the bought manures and carriage being
charged. On Lady-day entries the sum
fallows are paid for as at Michaelmas.
drainage there is an allowance of four o
years, according to circumstances. Lin
and cotton cake are allowed for at the
of a-quarter for the last two years, and
same allowance is made for lime, but
out the cost of the carriage for the sec
year. In Nottinghamshire, on a Michael
entry, the in-coming tenant pays on the
or summer fallows for the acts of husban
the rent, rates, and taxes, also the manur
lime applied, and the labour of appl
them. He also pays for the turnips at a
suming price, together with two-thirds of
cost price of the bones or other appr
artificial manures. On the grass land he
to pay for one-third of the value of the
consumed in the preceding summer, and
the hay and straw of the last summer
consuming price. On the Lady-day taki
the out-going tenant is allowed liberall
the wheat on fallows and for turnip fall
He receives consuming prices for hay
straw, also from manure made from pro
of preceding summer and labour ther
a-quarter of the cost of the linseed
consumed in the last two years, w
payment, however, is not quite to
classed as customary. Staffordshire,
bones and lime are allowed for, ext
ing over three years. Draining is paid
the allowance extending over seven y
The out-going tenant also has an away-g
crop of wheat. In the North and East
ings of Yorkshire, the principle of compe
tion is spreading. In the West Riding, cus
varies considerably. In some instances,
out-going tenant is even allowed on the tu
or summer fallow one year's rent and t

ll as for all manure purchased, the
ngs of the fallows, and the manure,
g a deduction for the green crops. On
half tillage" land (seeds, bean and pea
le) he is allowed half the rent and taxes,
ressings, half the manure, three-fourths
nes, and one-third for guano, less half,
eduction for the last green crop. In
parts, purchased manures are paid
full cost if no crop has been taken,
fter a crop the out-goer receives half the

The above information (from Mr
's able essay on the Farming Customs of
nd) shews us clearly that tenant-right,
gard for tenant's capital invested, is
ding. The very terms, oil-cake, bones,
age, are too recent in agriculture to
of this being doubted, and such allow-
have evidently become engrafted with
ld system of custom.

THE QUESTION AFFECTS THE COUNTRY.

other countries, unfortunately, no such
nable allowances are made, but there is
doubt that the good example already
d will spread, and the true value of
are somewhat ambiguously termed un-
sted improvements will become better
stood. Before proceeding to speak
the actual adjustment of the claims of
t-going tenant who is leaving his farm
high state of artificial fertility, directly
ght about by the investment of his own
al, I have a word to say upon the
general question as it affects the
try at large. The public have a right to
nd that the country shall be well cul-
d. Or whether they have a right or
t is not improbable that the question of
ublic or commonweal (commonwealth)
is particular may be mooted. No man,
ver, will develop the capabilities of
oil to the utmost (especially clay soils)
s he is made secure to an extent which
t-right can scarcely reach to. It is
the purchaser, the owner, who can reap
dvantages of his agricultural improve-
by the real increase in value of his
, which may be realized by an oppor-
sale. Every one cannot be an owner
of land, and a man of small capital is not to be advised to lock up money in a 3 per cent. investment. It is, however, only just to the public, as well as to the farmer, that tenant's capital should be secure, and security can only be obtained by giving the tenant a more permanent interest in the land. I need not, I think, argue in favour of a lease before the present company, because I believe most of the gentlemen present have made up their minds in favour of this mode of tenure. A lease, among other things, is accused of favouring an "up-and-down" system of farming. You improve for seven years, you keep up the fertility for seven years, and you take it out for seven years. This is, I cannot help thinking, both natural and commendable, but it is nevertheless unfortunate for the country, and may be remedied by the introduction of tenant-right clauses into leases; and I believe this would knock the ground from under those who would make out a case against leases. These gentlemen object to leases, first, because under them there is this "up-and-down" system of farming, and, secondly, because the end of the lease gives an opportunity for raising the rent, which, in the case of a yearly tenancy, rarely occurs. Now, if you introduce a proper tenant-right, the first of these objections clearly gives way, and I believe the second would also disappear, because if the farm were really improved by tenants' capital, the tenant-right should come into operation at the end of the lease as a set-off against any proposed rise of rent. There is only one other suggestion which I shall mention as apparently meeting the case; I refer to the proposal to do away with the six months' notice to quit altogether as far too short a period for a farmer to transfer his business. Substitute a two years' for the six months' notice, and introduce a proper tenant-right, and we should soon witness an immense improvement in the agriculture of the country. I do not mean to say that this is yet applicable to the condition of backward districts where the tenantry are too poor and ignorant to be trusted with greater powers than they at present enjoy, but I do think that the condition of the greater part of Eng-

land justifies a greater liberty of action being given to the tenant-farmers.

CHEMISTRY AND UNEXHAUSTED IMPROVEMENTS.

I am confident that, with our present knowledge and agricultural organization, there would be little difficulty in coming to a decision as to the money value of unexhausted manures, foods, and other more permanent improvements, such as drainage, claying, marling, buildings, &c. So far the attempt has been made without sufficient regard to chemical evidence, and I certainly would recommend that any committee for adjusting the claims of tenant-right, should not only represent the landlord and tenant interest, but also be a representation of scientific knowledge in the form of a good agricultural chemist, whose opinion would be valuable in fixing the relative value of manures and foods as fertilizers. In recommending this, the only real difficulty I see is the few men there are in this country who know anything at all of agricultural chemistry. No system of tenant-right can be sound which is not based upon truth. The estimates must be based upon experience, upon direct experiment, and upon chemical evidence, and not upon the mere dictum of a land-agent. Glancing at some actual and proposed schemes of compensation, there is sufficient evidence of confusion. Mr Piper, before the Swindon Chambers (Dec. 1870), quoted from the scheme of an eminent land-agent, in Devonshire, as follows:—The tenant to receive compensation for unexhausted improvements according to the following rules. Rule 1.—Bone manure with turnips over 5 years: 1st year, the tenant to be allowed 20s. in the £1; 2d, 10s.; 3d, 5s.; 4th, 2s. Rule 2.—Guano over 4 years: 1st year 20s. in the £1; 2d, 8s.; 3d, 4s.; 4th, 2s. Rule 3.—Superphosphate of lime and other manure for turnips, the same as Rule 2. Rule 5.—Corn, linseed or oil-cake, fed in the last year of tenancy by fatting stock or sheep, to be repaid 20 per cent. Rule 6.—Purchased yard, pig or any decomposed manure, 1st year, 8s. in the £20; 2d year, 4s. Contrast this scale with that proposed by Mr Bellamy to the North of England Chamber, in which two-thirds of the bones and guano are to be paid for after a green crop, and if a way-going crop is taken after such green crop, then one-third only of the expense. Dissolved bones only to be allowed for at the rate of one-sixth of their value after a green crop, and are supposed to be worth nothing, after a corn crop has been taken. No mention is apparently made by Mr Bellamy of purchased foods spent on the land. In Lincolnshire, the whole of the bones are paid for after a turnip crop, and one-fourth of the oil-cake bills for the last two years. Mr Masfen, in his admirable paper on "A farm agreement" (London, 1869), said, "Mr Cadle proposes compensation for artificial food and manure, and that on a liberal scale, and I think it will meet with many supporters; as far as the food is concerned, I will go with him, but I am not disposed to sanction his views as regards superphosphates—the last year but one for a manufactured manure. The last year, in my opinion, goes far enough." This last opinion is supported by the experiments of Mr Lawes, of Rothamstead, but controverted by Dr Voelcker. For my own part, I have long doubted the efficacy of superphosphate guanos as a means of really improving land except indirectly. Their effect is generally ended with the crop to which they were applied. At the same time, by increasing the yield of turnips and of straw, they eventually increase the "muck-heap," and that will be of more permanent advantage to the land than any expenditure on so-called "artificials."

THE VALUE OF FOOD RESIDUES.

With regard to the value of food residues, they, as being incorporated with and enriching the farm-yard manure, are probably of greater permanent value than guanos and superphosphates. The difference in the value of the manure produced by various feeding-stuffs is, however, so great that no person is entitled, as in the rules above cited, to class corn and cake together.

ding to Mr Lawes, the money value of
nure made from 1 ton of decorticated
seed cake is £6, 10s., or not much below
ice of the cake itself; that from 1 ton
e cake is worth £4, 18s. 6d.; and that
ton of linseed cake £4, 12s. 6d. On
ther hand, the manurial value of the
e of 1 ton of barley consumed is only
os.; of wheat, £1, 13s.; of oats, £1,
and of malt, £1, 11s. 6d. The fixing
payments for manures and feeding-
is, then, the most difficult part of the
m before us, and it appears to me that
awes' opinion should be carefully con-
d with reference to it. Mr Lawes
lone much towards proving that
may be kept in condition equally
rtificial manures and by farm-yard
but when he comes to consider the
nency of effect from the various classes
nures used, he arrives at the following
sion:—"That when active nitrogenous
es, such as Peruvian guano, ammonia
or nitrate of soda, are applied in only
oderate quantities usually employed in
cal agriculture, the unexhausted residue
the soil after the removal of a corn
as but little effect on succeeding crops.
when rape-cake and other organic pur-
l manures which yield up their fertiliz-
ements comparatively slowly, are em-
l, the unexhausted residue left after
moval of the first crop, may yield an
iable amount of increase throughout a
n. That when farm-yard dung is em-
l, the effects may be apparent for a
onger period. That when mineral
es, such as phosphates, salts of
&c., are used, the effects of any
austed residue are too slow and gra-
o admit of any determination of their
" Again, "It has been shewn by re-
e to direct results that some important
tuents of manure either leave little or
exhausted residue in the land, or leave
combined within the soil, or so distri-
throughout it that it produces little or
preciable effect on succeeding crops.
manures, on the other hand, have been
to produce marked effects for several years after their application. It is obvious, therefore, that it would require a very complicated sliding scale to enable us to estimate the value of unexhausted manures under the many varying conditions that would arise." It is considerations such as these which led Mr Lawes to the following very practical expression of opinion:—"It would, I think, be more satisfactory that all valuations should, if possible, relate only to what is above ground. Nor do I see any difficulty in doing full justice to the out-going tenant without taking into account the value of the unexhausted residue of manures which have already yielded a crop." The three items upon which Mr Lawes would rely as the basis of a valuation in favour of the out-going tenant are—the farm-yard manure made during the last year of the occupancy; the manure from purchased food which has not grown a crop; and the straw of the corn crops of the last harvest. This conclusion of Mr Lawes has been criticized (especially by Mr Smith, of Woolston), as providing an insufficient remuneration for the out-going tenant. It is, however, capable of expansion, and appears to me to be based upon a sound principle, for, after all, the *expenditure* in various fertilizers is of less importance than the effect of such an expenditure. What better claim can a tenant have for compensation than by shewing that he has raised the yield of the corn crops and the quantity of manure upon the farm? If this has been done by proper means, I cannot see how a simpler basis for calculation can be obtained than by the results of such good cultivation as above indicated. Here, then, is one means by which nearly all the tenant's land improvements may be compensated to him. It is not, however, perfect, because it does not provide for the outlay of money upon drainage, liming, marling, claying, &c., which may have been done by the way-going tenant, and which still have a prospective value. These improvements must still be paid for on a sliding scale, not difficult to construct. Improvements to house and buildings, roads, and fences, will readily be valued by experienced men.

THE PRACTICE OF AGRICULTURE.*

By Mr MORGAN EVANS.

MR MORGAN EVANS said it would be impossible in one lecture, or in a dozen, to go over all the ground included in the two wise old sayings which he had chosen as the title of his address, the motto of the Royal Agricultural Society, "Practice with Science," and that of the old established Bath and West of England Society, "Work and Learn." He thought the more they farmed in harmony with these two mottoes the more successful they would be individually, and the greater would be the benefit to the nation from their agriculture. Their present agricultural position had been attained by a slow gradual process rather than by sudden leaps. Experiment and experience had led them where they were, but the light of science, although a light from Heaven, had not unfrequently led them astray. They had not looked simply enough at the operations of Nature. They were rather pleased than otherwise to find out mysteries which practically did not concern them. They theorized when they should work, and drew conclusions on which they preached without putting them to the test in the open field. They dogmatized and deluded agriculturists, and inoculated them with false views which would take a generation to eradicate. Some of these teachings had so infected the minds of the great landowners that utterly absurd clauses were inserted in leases, thus cramping the operations of the tenant-farmer, who had to farm to order. The terms of some modern agreements appeared to be made for the purpose of teaching a farmer his business. He must grow only certain crops, and these not too often. The owner of the soil had little faith in his land, and no reliance on the farmer. If the soil required such hedging around, it must be a very unstable article to deal with; and if the farmer was to be educated in his profession by lawyers and land agents he was totally unfit to enter upon another man's property. If he had to farm by routine he was little better than a farm bailiff, and not his own master. Brains were a nuisance to him. But honourable terms of agreement for mutual protection were necessary in every contract, whether it was for a farm in the country or a house in the town, a shop or 500 acres in the Lothians.

THE RELATIONS OF SCIENCE TO AGRICULTURE.

Chemical science was an important auxiliary, and an honourable handmaid to agriculture; and they would ever be indebted to science for the impetus given to artificial manures. The agricultural world, too, was greatly indebted to the researches of scientific men, although the results obtained in the laboratory, and the conclusions arrived at too hastily, had not been corroborated when put to the test of field experiment. What appeared abstract truth in the laboratory, vanished when brought to bear on the soil or our hills and valleys. Sun and shade, natural fertility, and the nature and variation of the seasons in our changeable climate, had not been taken into account. When the great German chemist Liebig proclaimed that in a few decades England would become utterly sterile from exhaustion of the mineral constituents of the soil, he did no little damage to British agriculture. Much which had been learnt from him and his school had to be unlearnt. Notwithstanding that Mr Lawes had for many years demolished the bugbear of "exhaustion," the theory still underlaid almost all the popular teachings of the day. Leases and farm agreements

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* Read before the Midland Farmers' Club.

;hout the country still continued to be l in accordance with the exploded ne. Landlords looked on in conster- . at the continuous croppings, or the al of more than the usual produce of rm. The cheese-factory system, amongst , had been condemned as ruinous, be- the milk was sold and there was no whey d pigs with. Farming could only pay lling farm produce. Surely, with all esources in the way of manures, the ;e, if any, could be repaired. The they could sell off the land, year by vith a profit, the more they could might ssured that the natural fertility of the as uninjured, whether the produce were milk, butter, cheese, or wheat. The vas a machine, which, unless it was fed : end, would not deliver at the other. ould not be supposed to argue that all raw could be removed from the farm ut serious damage; for, besides its as fodder, and its manurial value in cal constituents, it was a great vehicle llecting other manure, and retaining it ortable form.

PRACTICE : HOW A FARMER SUCCEEDS.

:r all was said there was no manure to hat of the farm-yard. Its power of re- g moisture in the soil was one of its st advantages, especially in dry sum- and its merits in this way were to be lered when fixing its comparative price ition to other manures. Again, chemists, 's gone by, had been loud in their pro-)f the wastefulness of spreading manure : fields in autumn, averring that the loss monia by so doing was costly and ruin- But Dr Voelcker now told them that istom of their forefathers was not only jurious in practice but positively to be mended, and there appeared little that former teachings on the matter devoid of truth, and illusory. Similar , originating with scientific theories be mentioned, but these few must for esent suffice. Since the latest revival icultural chemistry, now upwards of a quarter of a century, much good work had been done; but it must be allowed that the expectations formed of the benefits to be derived from chemistry had not been fully realized. It did not appear to be at all indispensable to the farmer that he should thoroughly master chemistry, geology, or any other science. Let the young farmer, before entering on a farm, learn the best way to plough, to sow, and to reap. Let him study the climate, and the farm practice of successful agriculturists in the locality. Let him be well up in the machinery and working of the farm, be able to judge when the soil was in a fit state to receive the seed, and when the harvest was ready for the reaper. A practical knowledge of how to feed a horse, or an ox, would be of more immediate use to him than the nice distinctions about the proximate and ultimate elements of food. A superficial knowledge, or a parrot-like acquirement of technical science, was often very dangerous. What was required to succeed in farming, as in other professions, was a clear, wise, logical head, capable of making correct use of the best information. What was wanted most in the farmer was, as he had already tried to shew, not so much a minute technical knowledge of abstruse problems in chemistry, geology, or meteorology, as a well-trained logical mind—in a word, sound common sense. Farmers in the present day were an educated class; the arguments and plain deductions of chemistry being understood by them sufficiently to appreciate the evidence of experimentalists in field agriculture. He need hardly say that no farmer should be unacquainted with the literature of farming; that he should be versed in the latest investigations having a practical bearing on farm work. Indeed, he should know something of the relation of several sciences to his occupation—and they were many.

MODERN AGRICULTURAL IMPROVEMENTS.

Notwithstanding the great progress made of late years in agricultural science, there was ample room left for further experiment.

With all the recent development of dairying—to mention only one branch of agriculture—both here and in America, many points in dairy practice had not been definitely settled. Discussion still went on, as to the comparative merits of deep and shallow pans for the setting of milk. Churning the whole milk, or only the cream, was another fruitful source of argument; and the effect of different foods on the chemical constituents of milk—how far the quantity can be increased, and the quality altered by feeding—had not been accurately determined. It was much to be regretted that we had no Minister of Agriculture in this country. The different Governments—Tory, Whig, or Radical—paid little heed to the advancement of agriculture. Experiments which had important bearings on the productions of the farm and the fertility of soils were left to private individuals. A commission on agriculture was, to his mind, quite as important as one on fisheries or the preservation of oyster beds. It was very important that all farm experiments should be faithfully reported, and that all surrounding conditions should be taken into consideration. He was one of those who believed that Mr Mechi had done immense good when he had been wrong as well as when he had been right. The energy he had shewn in agriculture could not be too highly praised; neither could his love of farming, and the perfect frankness of his utterances. They might wish, though, that he were less credulous of the boastful tall talk of his friends and neighbours.

THOUGHTS ABOUT AGRICULTURAL IMPROVEMENT.

MR DINGWALL FORDYCE, M.P. for East Aberdeenshire, has published a pamphlet entitled "Improvements in Rural Economics." The pamphlet is composed of a lecture originally delivered before an agricultural society in the north. Its great point is the want felt by the agricultural community, both in England and Scotland, of technical instruction in the art of farming. Mr Fordyce holds up the example of Prussia and France as models in this respect. In the first-named country, there are four royal schools of agriculture, and there are also agricultural chairs in the Universities of Halle and Berlin.

Says Mr Fordyce :—

> "To Eldena, one of the royal schools of agriculture in Prussia, there is attached an estate of 55,000 acres, broken up into sixteen different sections, comprising eighteen villages, with seven thousand inhabitants. The farm attached to the school has on it twenty-six work horses, and a proportionate number of stock. A brewery and brick and tile work are also attached to the farm. At these agricultural schools the course of study extends over two years, and the pupils receive instruction in practical agriculture, in aboriculture, and the application of science to such arts as the making of sugar, beer, tiles, and bricks, while lessons are also given in mineralogy, geology, botany, chemistry, besides practical tuition in the engineering art, and lectures on parochial law, and other matters likely not only to make a farmer a successful agriculturist, but a good and useful member of society. The entire cost of these two years' study is not more than £17. Even in France, prior to the war, fifty farm-schools were maintained at the expense of the State, in which instruction was given to about fifteen thousand apprentices in the art of farming. At each of these fifty schools there were six professors, and the course of study extended over two years. In America, before the war, arrangements were made for the establishment of agricultural colleges, for the maintenance of which large grants of land were allocated. The quantity of land allotted to the State of Ohio for this purpose is not less than 630,000 acres, yielding an annual income of £7500.

State aid to any society we do not care for. Props are only necessary when weakness sets in, and we hope it will be long before agriculture in this country arrives at that senile stage. Without the help of the State, and with but little encouragement, in many instances, from landlords, the condition of agriculture in Great Britain is better than can be pointed out in any kingdom in the world. But then it is not yet so good as it ought to be, nd the State, without giving eleemosynary aid, night do much to produce an increase in the ood of the people. There are many agricul-ural grievances to remove. Let us note the incidence of local taxation; the Malt-tax ought not to press so heavily upon the growers of barley; and something might be done to preserve the crops from the ravages of game. With a Department specially appointed to look after the agricultural, as there is after the commercial interests, much good would accrue to farmers, and through them to the community generally. There is much waste land reclaimable, where criminals could be more usefully and profitably employed than in teasing oakum, or doing endless rounds on the treadmill. Smiling corn fields are pleasant and profitable; and these might be made out of the many desert places which yet abound in the country, by the labour which at present produces next to nothing. This aid, the State might give to agriculture. Why should shipping and building monopolize all the bone and sinew which assize and justiciary courts throw upon the State? Portland and Pentonville are good works in their way, but the wastes in the land, in the interest of agriculture, ought to have a share of the forced labour. Such lands being brought into cultivation, farmers would have more chance than they now have of making fair terms with their landlords.

There is one thing—not in connexion with the State, but in regard to a very wealthy and influential agricultural institution—which Mr Fordyce said, that we entirely agree with. It is this:—"The £50,000 of accumulated capital which enriches the coffers of the Highland and Agricultural Society could be more usefully spent." Much good, as we have before pointed out, might be done with this money. It is no use where it is, except for the accumulation of interest; and to make money was not the object for which the Highland and Agricultural Society was established. It was organized to collect money to expend upon promoting improvement in the cultivation of the soil. The Directors of the Society, however, are not so much to blame as some of their critics allege. The sharp-pointed, fault-finding pens do not clearly shew the direction where the "siller" ought to go.

Speaking about silver and agricultural improvement, we notice that Colonel Tomline—whose *abundant* silver is to him a source of excessive annoyance (numbers of people would be glad to relieve him of it, although the Chancellor of the Exchequer refuses)—at the Lincolnshire Chamber of Agriculture, made a sneering remark about Mr Mechi, which we think quite unjustifiable. He said (after stating, what was not quite accurate, we are sorry to say, that Chambers of Agriculture are doing a great deal of good)—

> Many people criticised and dictated to them [the farmers]; it was now high time for them to criticise, and, if possible, reform other men. He did no' mean that they should sit to hear lectures on the reform of razors and dressing cases by Mechi, or lecture on cold steel as he did (laughter), but the misery and poverty of London and other large towns.

From some of Mr Mechi's views we dissent; about the correctness of some of his figures we are not quite satisfied; but we hold that there are few men living who have done more to stimulate improvement in agriculture than Mr Mechi. His crusade against the old-fashioned style of farming—against what cannot be otherwise described than as the ignorance and waste of farmers, has produced good fruit. Colonel Tomline's raid against the Mint may be exceedingly pleasant to himself, but up to the present time it is fruitless. The steel, in the case of Mechi *versus* Tomline, is decidedly superior to the silver.

FUNCTIONS OF CHAMBERS OF AGRICULTURE.*

By Mr Bowen Jones.

I HAVE always considered our association is useful as an organization for two distinct purposes:—(1) For political action in order to enable us to hold our own as a power in the empire, and, if possible, improve our position with regard to other interests, that have, by superior combination and activity, accomplished a reduction of from fifteen to twenty millions of taxation in about as many years, while we have been left in the lurch. (2) As a medium through which we can the more readily bring about the general improvement of agriculture, and the accompanying advancement of the respective interests connected with the land. In the first sense alluded to we have agitated such questions as Cattle Legislation, Education, Malt-tax (which I regret to say has yet to be revived), Local Taxation, and the many branches incidentally connected therewith, especially affecting ratepayers as well as others; and I think it must be acknowledged by candid and reflecting minds that in many respects in connexion with subjects of this nature we should have been on a very different footing at the present time had we not co-operated and worked together with an earnest good will. With regard to what I look upon as the other branch of our functions, I may remark that the various points to be adjusted lie alone between those who are connected with the land itself, viz., the landlord, tenant, and labourer; and, perhaps, uppermost amongst the barriers to an improved system of agriculture have been over-preservation of game, the system of rack-renting land which has hitherto so generally prevailed, and the deficient, and in some cases, shall I say, degraded state of education, both amongst many of our class and also the agricultural labourers. It is impossible, on an occasion like the present, more than to allude to these multifarious and vast matters, but I must give expression to the views that I earnestly feel the necessity of some better system of holding land than that based on a six months' notice to quit. The sound of tenant-right is alarming to many minds, and amongst them—judging from what I can catch from the remarks of the honourable member for Shrewsbury, with whose views I generally agree—of his also, simply from non-consideration. I am in a position to appreciate, as much as any man, the value of the sentiments he expresses with regard to the feeling that should exist between landlord and tenant; but I cannot conceive why tenant-right should interfere with this good understanding, for it means nothing more and nothing less than security for capital invested for which a tenant has not derived a return, and could be easily settled in the form of an agreement or by arbitration if generally recognized, without the assistance of a measure in Parliament. I can't here enter into the arguments *pro* and *con*, but even in cases where owners have every desire and also possess the capability of meeting the tenant in permanent improvements (and from various causes how often is this not the case?) there is a large outlay required on most land before an adequate return ensues, and this will never be made to the extent it should without suitable and sufficient security is given. The dense population of this island demands food at a rate that we can't now anything like supply; but I believe that the resources of our soil, developed to its full capabilities, would at the present time almost fulfil the requirements; but I fear this will never happen without security being given for capital invested in the soil, the effects of which would be to increase the value of the land, reby prove to the advantage of the ner—improve the position of the because he would be enabled to secure eturns from the soil—and elevate the on of the labourer, because the pro- of the larger crops would require a amount of labour, and that of a r character, that would necessitate ottages being built upon the farm. ere I would observe, if tenant-right is ed, it will be utterly useless to the mer, and every landowner should in be protected from bad tenants as s good tenants should have an oppor- of improving their land without risk. d before I conclude respecting the r, although I may perhaps be trench- other speakers' ground. I hear the ne up from South Shropshire, 9s. a- nd a drop of cider; and I turn to my account for the last twelve months nd, excluding the stock-men from lculation altogether, that most of inary farm labourers earned about 14s. ek, and averaged under ten hours' er day. The rate of wages is the same me, and no doubt my calculation is ble to my district, and I am at a loss erstand the inequality thus shewn be- wo districts within twenty miles of one another. Practically I know where perquisite are given they are not estimated at much; and I cannot help fearing that a fair allowance has not been made for them in the statements that have lately gone forth to the public. Now, remember, I sincerely desire to see the agricultural labourer's lot improved and his wages increased; and I know no class whose position has altered more of late years; but in return for this, the farmer has a right to require a proportionate improvement in the character and amount of work done. It is not by a claim for a fixed rate of wages that these matters can be settled; the effect of such a course would be only to increase what already exists to too great an extent—an unequal payment according to capability—and the result would be to drag the best workmen down to a level with the worst. The improvement of the labourer, like that of the farmer, must depend much upon himself; and a fixed rate of wage, were it possible, would no more tend to elevate the working man than a system of tenant-right would improve the position of a bad tenant-farmer. I have not time now to more than dogmatically state that the additional demand that each labourer shall have sufficient land to keep a cow is both unfeasible and preposterous.

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* Delivered before the Shropshire Chamber of Agriculture.

AN OLD WRITER ON PLOUGHING.

E all know that it is only by studying the customs and detecting the of our forefathers that reform in any of life is brought about. The ob- e of antient modes of procedure serve y to improvement in modern experi- and agriculture is perhaps the best tion of this principle of progress that ssibly be taken up. A century, or entury ago, the bucolic mind was in of listlessness. Ploughing, seeding, ping were pursued in a very mechanical fashion; and the relation of one subject to another, the causes and attendant effects of each matter to the other were little studied. In fact all accounts go to shew that our forefathers in agriculture took things pretty much as they came. Old agricultural writers seem to have preached to little purpose to their contemporaries. Take for instance, what Dickson, in his "Treatise of Agriculture," writing in 1769, says:—"Fallowing is an improvement but lately introduced, and has not made such progress as its utility deserves.

That distrust of .futurity, natural to man, makes him averse to lose a certain crop, from the prospect of having that loss made up in after years. This, with an attachment to customs, rendered sacred by antiquity, naturally prevents any remarkable change in the conduct of those persons whose minds are not opened by education." Following the same writer on some remarks which we find in his "Treatise" on "more frequent ploughings as an improvement," we shall briefly summarize the views therein expressed, feeling satisfied that, even at this distance of time, when double-furrow ploughs and steam cultivation come so prominently to the fore, they will be at least interesting, if not instructive to agriculturists.

The writer, at the outset, says that it is a common practice in Scotland, "where agriculture is best understood," to plough land intended for barley thrice before sowing the seed. Of that practice he entirely approves, but he proceeds to ask why additional ploughings should not be given to other crops, such as peas and oats. Wheat, he dismisses as not capable of receiving the advantages of additional ploughing, inasmuch as "after the peas are removed there is time only for one ploughing before the season of sowing; at least, if two are given, the second must be so soon after the first that little or no advantage can be expected from it." As regards the expense of such frequent ploughing, our old writer advises farmers to proceed cautiously should the land they hold be poor, lest the returns, however considerable, should not adequately balance the outlay. But with respect to land possessing a natural fertility, the case, he assures us, is different. The expense of management is much smaller in proportion to the value of the crop; "and besides, the improvement given to land by tillage has a greater effect upon rich than poor land, may probably be nearly in proportion to its original fertility." After distinguishing between rich and poor land, Dickson continues :—

"Now, as by rich soil we understand that kind of soil that is most proper for the nourishment of plants, and as every kind of land produces the weeds best adapted to the nature of the soil, it plainly follows that the weeds by which rich land is infested, are of that kind whose food most nearly resembles that of corn, and therefore are the greatest robbers. And as rich land has, generally speaking, more weeds in it than poor land, and as the weeds by which it is infested are the greatest robbers, it follows plainly, likewise, that the additional ploughing proposed, so far as it answers the end of destroying weeds, is more beneficial to rich than to poor land, perhaps even in a higher proportion than its fertility."

The above is a curious, and on the whole, ingenious argument in favour of the frequent ploughing of good land. We should like to know whether there are any weeds really *best* adapted to the nature of the soil, and whether at the present time rich land "has more weeds in it than poor land." We do not think, also, that the writer proves his assertion, that a rich soil gains more "in proportion" than a poor soil, as, by applying proportionately the same trouble and expense to each, both soils operated upon would gain relatively equal benefit. The Rev. Mr Dickson proceeds to say that by ploughing more frequently the economy of the farm is somewhat disturbed. The operations being performed in winter (and he supposes them "introduced into schemes in which there is no fallowing"), the labour on the farm would not be sufficiently strong unless recruited, and this, of course, would involve additional expense upon the farmer. But this, our writer is of opinion, could be obviated, if less work were left over to the winter months, and more done during the summer. Dickson continues :—

That these additional plowings given to the land, designed for pease or oats, may be more proper for the purpose mentioned, of exposing the land to the influence of the air, and destroying weeds, it will not be amis that we give some directions about them. The most important one is, that they be given as soon as possible after harvest. This cannot be very soon, except when there is a great proportion of fallow. When there is little or no fallow, a great deal of time is taken up after harvest in fallowing the bear-land and making the wheat seed, both of which must be preferred to the proposed additional plowings to the pease and oats. When the barley land is fallowed and the wheat seed is made, the farmer begins plowing the oat land in course. All that can be said then, is, that he must lose no time, but, as soon as the crop is taken off from the field, begin this work of plowing, and, by other hands if necessary, finish what remains of harvest work in the most backward fields, or in the barn yard.

In the first plowing to the oats and pease, the earth of the furrows may be taken off as broad as the plough can do conveniently, and at the same time plow clean. The deeper, too, that the plough goes, provided that the soil allows, and the narrower that the ridges are, the design of this plowing is the better answered. By this the soil is exposed to the influence of the air, and better able to resist the rains. Unless the winter is very unfavourable, much rain and little frost, there is reason to expect that after a plowing of this kind, the land will be in a very good condition in the spring, as the frost, from the exposure of the soil, gets easy access to meliorate it, and destroys the roots of the weeds. In the spring, if the weather is dry, and the land much infested with seed weeds, it may be harrowed. This smooths the surface, destroys any weeds that are beginning to vegetate, and exposes others to the influence of the air. When a second crop of weeds is beginning to appear, the seed may be sown and plowed in with a very shallow furrow. In that situation, it may be left for some days, and then harrowed and water furrowed, too, if necessary.

These extraordinary plowings to the land designed for pease and oats, are all that can be added to those schemes by which the land is made to carry a crop every year: But others may be added in the schemes in which fallowing or sowing turnip is used; and perhaps to greater advantage, tho' they appear to have less need of them. When there is a regular fallow once in five years, if wheat is sown upon the fallow, then for the four crops there are commonly eight or nine plowings; three or four for the wheat, one for the pease, three for the barley, and one for the oats. If barley is sown upon the fallow, then there are commonly only six or seven, three or four for the barley, and one for each of the others. When comparing these two schemes together, we considered it as an advantage that there was less labour and expense in executing the one than the other; and this was very proper when the value of the produce of the two was compared: And upon the supposition that the value of the produce of the four crops is the same in both schemes, the one that raises this value at the smallest expense, is certainly to be preferred.

We must now extend our views a little further, and consider these plowings not only with relation to the immediate crops, but also with relation to the crops that follow in the rotation. It is here supposed that barley is sown upon the fallow, and that oats and pease are the two crops introduced betwixt the barley and wheat; and these are the crops to which it is proposed to give the additional plowings. Now, is it not more than probable that these plowings will have a very considerable effect upon the crop of wheat. Upon the crop of pease it has generally been observed depends the crop of wheat. When the crop of pease is bad, the farmer, tho' he intended to sow wheat, is, however, afraid to venture it, and often alters his plan. On the other hand, when the crop of pease is very good, he is tempted sometimes to sow wheat, from the hopes of a good crop, tho' his original plan was to sow barley. Now that the two additional plowings are in some measure a security for a good crop of pease, few farmers will deny. The land being plowed, in deep and wide furrows before the winter, receives much greater benefit from the frost and air, than when it lies unplowed, the stubble being early plowed down is rendered more beneficial; and besides, the weeds are so much discouraged, that the pease get ahead of such of them as vegetate, and thereby destroying them, the crop is in some measure secured. This scheme, then, of giving the two additional plowings proposed, may be very safely tried by them who sow barley upon the fallow, and thereby the expense is no greater than when wheat in sown upon the fallow, and the advantages arising therefrom not uncertain.

The adding these additional plowings when wheat is sown upon the fallow, may likeways be of advantage, tho' the benefit arising from them is not so obvious. The three plowings given to the barley in this scheme render the preceding culture the less necessary; and the oats being the crop immediately before the fallow, less regard need be paid to the destruction of weeds in the culture of this crop, as no after-crop can be much affected by them when a fallow intervenes.

In whatever manner plowing operates, whether by enlarging the pasture of plants, as Mr Tull supposes, or by exposing the soil to the influence of the air, and thereby increasing their food; or by destroying weeds, or by doing all of these, as is most probable; yet this is certain, that all ages and countries have experienced the benefit of it. In the general, therefore, it may be said, that an increase, if done with judgment, must always prove beneficial. It is this maxim that has introduced the extraordinary plowings to the barley-land; and it is this that has introduced the practice of fallowing. When treating of this most beneficial and important operation, it was proposed that the fallow should receive the first furrow early in the spring. This is but seldom done. It oftens happens that the fallow is not touched till after the barley seed is finished, then the soil is so hard that it is difficult to plow it, and when plowed, it rises in such large clods that it is difficult to reduce them. And while the fallow is in this situation, when it receives the first plowing, it may be observed, that the same kind of soil, after bearing perhaps a crop of wheat, having received two plowings for barley, is in a very good tilth when it receives the seed-furrow. This fallow ing plowed till after the season of the barley- not only loses, in a great measure, all the advan- of the air in the spring months, but the drought month of May, most effectual for destroying the of the quickening grass, and other root weeds. these things are considered, a spring-plowing to llow must appear to be of very great benefit to would go a little further, was I not afraid of sting too much the friends of old customs, and se that another furrow, as early as possible, in , should be likeways given.

these additional plowings are proper for the , they are still more proper for the land that is ed for turnip. Betwixt the time that the barley- is commonly ended, to the time of sowing the , it is scarcely possible to bring the land, unless lly very light, to a proper tilth for this crop. nless the soil is reduced to a power, a good crop to be expected; a spring-plowing is therefore ary; and if a spring-plowing is necessary, the on of a winter-plowing must be beneficial.

may be observed, on this occasion, that land lying unplowed, does not receive so much benefit from the frost as when it is plowed; and that if it is allowed to be thoroughly wet, and dried again before it be plowed, it receives no benefit from it at all. Nothing can be more evident, than that land when plowed, and made hollow and uneven in the surface, is more easily penetrated by the frost, than when unplowed, and lying firm and smooth. But it is no less certain, that though land is penetrated by the frost, and if plowed in that situation, would be found to be loose and open; yet if, after the frost is gone, it is thoroughly wet, and allowed to remain in that situation, then whenever it is plowed, whether it is wet or dry, the effects of the frost are found to be gone, and the soil as firm and compact as ever. Hence the common observation, founded upon long experience, that frost goes off well when it goes off without rain. This makes it of great importance to have land laid in such a situation as to receive the greatest benefit from the frost, and to receive the least damage from the rain; and this can only be done by proper plowing in the winter season, or before it, if possible.

Farm Engineering.

A FEW WORDS ON REAPING AND MOWING MACHINES.

MESSRS BURGESS & KEY have issued the following interesting pamphlet, ublished by Messrs Cassell, Peter, & alpin, on the recent improvements effected reaping and mowing machines. We give e paper *in extenso*, together with the illus- ations, with which we have been favoured :—

The practical introduction of reaping achines into this country dates from the reat Exhibition of 1851, when the rivalry etween the two American exhibitors, 'Cormick and Hussey, attracted so large a hare of public attention.

MACHINES NOW A NECESSITY.

The necessity for these machines was then omparatively small, but the demand for them as since gradually increased, owing, in great easure, to the high rate of wages offered for bour until the reaper has become an absolute ecessity, as the farmer finds himself more ependent upon it for the harvesting of his rops.

The great question now agitating the whole f England, from one end to the other, is that f labour. When we find that manufacturers re obliged to pay the same wages for nine ours that they have hitherto paid for ten, nd that they are offering employment to un- illed labourers with far higher wages than ey have been accustomed to, it is impossi- le to escape the conclusion that the farmer's ifficulties will be more widely increased in e future. Now it appears to us that the me has arrived when agriculturists will see e necessity of adopting the course hitherto ursued by the manufacturers, viz., that they ill look more closely to see that the ma- hinery on which they are dependent is correct principle, and that it combines the greatest ving of labour with the greatest durability.

GREAT IMPROVEMENT IN REAPERS.

After twenty years' personal experience in the manufacture of reapers and mowers almost exclusively, we make no apology in calling attention to what we find to be one of the greatest improvements, if not the greatest, ever made in harvesting machines.

Now, so far as the work done, we have arrived at this state of things, viz., that there are several reapers and mowers which do good work; but what we wish to point out is that, owing to defective principles of construction in many of them, the work is done with too great an expenditure of power and too much wear.

To realize the importance of these defects, consider how desirable it is that a so-called two-horse reaper should really require only two horses to work it—yet how generally three are used! Indeed, the fact of their being described as two-horse machines shews a general feeling that reaping and mowing machines ought to be within the power of two horses; and yet the excessive draught has been tolerated as if it were an insurmountable difficulty.

It is at all times a recommendation to any machine depending upon horse-power that the draught be as light as possible, but especially is this the case with a reaping or mowing machine, which has to be worked under conditions ever varying as to the power required—the state of the land, whether soft or hard, smooth or rough, level or hilly; the condition of the crop, whether heavy or light, laid or standing, wet or dry. These and other circumstances render it of great importance to make these machines run as light as possible. Now it is well known that the wear and tear of a reaping or mowing machine (the weight necessary to give strength not being sacrificed) is in the direct ratio of the power required to work it; therefore, at the same time that we reduce the draught, we reduce the wear and tear, the two problems thus resolving themselves into one.

Seeing, then, how desirable it is that these machines should perform their work with the least possible expenditure of horse-power, a question arises whether they are constructed in strict accordance with the well-known laws of mechanics; for it is obvious that some amount of power must be applied—the question is, whether it is applied through such mechanism so as to reduce it to a minimum.

This is just what has not been done, makers having too long continued to build their machines on the type of the original American reapers of 1851. At that time it was a great thing to have succeeded in reaping at all by machinery, and if engineers had waited to see their way to an exact application of mechanical principles, we might have been without reaping and mowing machines to this day; but so much time has now elapsed that there is no longer any excuse

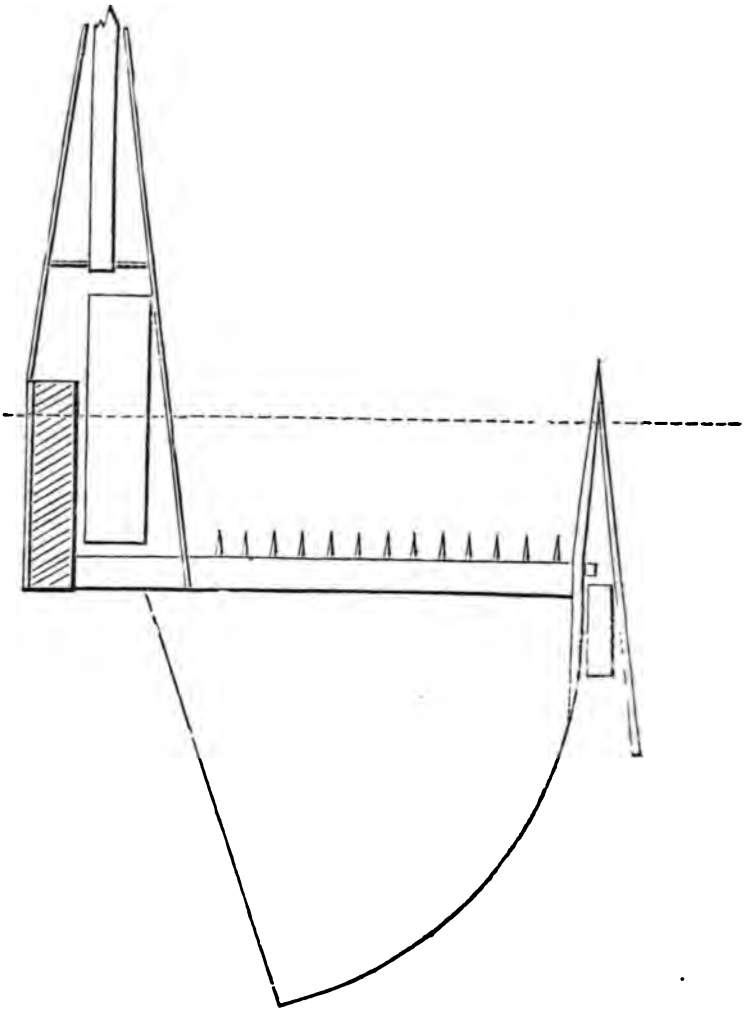


Fig. 1.—"Old System" Self-Raker.

t correcting the mechanical defects to exist in the original machines.

ACTERISTICS OF AMERICAN MACHINES.

1 shews the characteristics of the can machines, and we repeat that of our English makers still adopt in their self-raker reapers. The finger- projects out behind the main wheel. earings and crank are placed outside nain wheel. A long connecting-rod, ng from the outside and some distance he finger-beam. The crank is placed ove the line of the knife, so that the is made at a considerable angle. The land wheel is placed far behind the line main wheel.

s arrangement, which we call the "old a," is in every point mechanically de- , and involves complication, extra t, difficulty in turning or backing, &c.

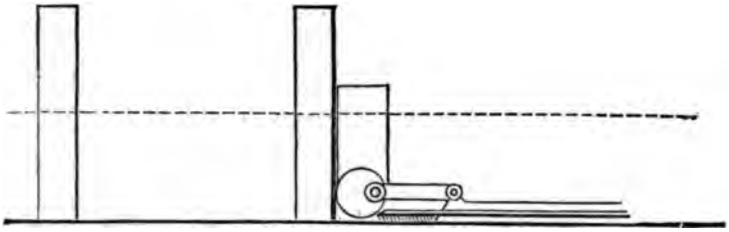


Fig. 2.—"New System."

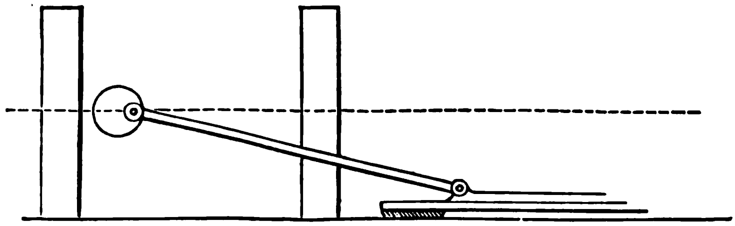


Fig. 3.—"Old System."

gearings being all on the outer side of ain wheel, their weights bear unequally main spindle, causing both it and the wheel to wear unduly. The finger- behind is bad as affecting the balance, ty, and simplicity; and the arrangement two carrying wheels, the small one far behind the other, causes side draught, and renders the machine difficult to turn or back. The crank being above the level of the knife makes it necessary, in order to reduce the angle of thrust, to have a much longer connecting-rod than it would require if it were level, as it should be, with the knife.

A long connecting-rod (that is, longer than necessary) also involves either weakness or excessive weight; and as strength is generally preferred, then the result is that to move that excessive weight to and fro, say from 500 to 1000 times per minute, takes much extra power, and causes much extra wear on the knife-side and crank-shaft bearing, to say nothing of the extra vibration imparted to the bearings and to the whole machine.

Again, it has long been admitted that the proper position of the cutter-bar in relation to the two wheels on which the machine moves is in a line with their axles; but the weights must be so arranged that the greater portion falls on the larger wheel. This arrangement was repeatedly pointed out as most desirable by Mr Amos, the Royal Agricultural Society's engineer; and the advantages held out were greater steadiness of the machine in work, easy movement over uneven surfaces, great facility for turning without cutting up the land, and also in back ing—in fact, to use Mr Amos's own words, the machine would be, in these respects, "more cart-like." Why was this desirable arrangement not generally adopted? Simply because, to get the knife in a line with the axle, it was necessary to have the crank on the inner side of the main wheel; and the long connecting-rod made the gearing and finger-bar project out so far, and the whole machine so wide, as to throw far too much weight on the small land wheel; therefore the old system was generally continued of having the gearing on the outer side, and, in consequence, the knife-bar either before or behind the main wheel.

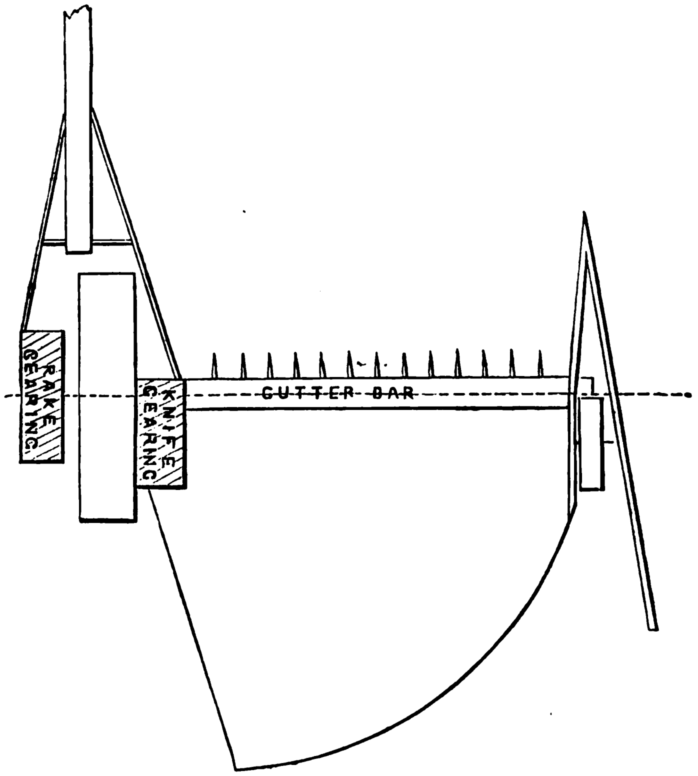


Fig. 4.—New Self-Raker Reaper.

THE REMEDY OF EXISTING DEFECTS.

It was to remedy these defects in mowing machines that, in 1865, we took out a patent for a new arrangement of gearing for reaping and mowing machines, the novelty being that the crank and connecting rod which gave motion to the knife were placed in a line with the knife. Now, to any one having any knowledge of mechanics without special acquaintance with the general construction of reaping and mowing machines, it would appear absurd that such an arrangement as we were then introducing should be a novelty, for he would say that in every steam-engine it was a principle about which there could be no two opinions that the best and only correct position for a connecting rod and crank was in a direct line with their work; yet so little regard had been paid, up to that time, to true mechanical principles, that our "new system" took every one by surprise. Still, like every great truth, it only required to be stated to be admitted; and we are glad to be able to refer to the Report of the Royal Agricultural Society, signed by their engineer and judges, in which our success is duly acknowledged.

The following is an extract from the judges' ort of the trial of mowers, referring to our ew system" of constructing mowers and apers (see *Journal* of the Royal Agricul-ral Society, 2d series, vol. i., part 2, page 3) :—

> **Burgess & Key, No. 2016.**—A new implement, the st noticeable feature being that the connecting rod nearly in a line with the knife. This arrangement rendered possible by having all the gear-work, the ank-shaft, and the connecting-rod packed up in a all compass, and placed very near the ground, so to traverse the narrow track cleared by the trackard during the preceding bout. Generally speakg, it is necessary, in order to prevent clogging, to ace the crank-shaft considerably higher than the nife, and the angular thrust of the connecting rod is tended with some friction. We may notice that the w position of the crank-shaft, &c., did not once use the machine to clog, and that this arrangement ay be regarded as good.

The report is signed :—

H. B. CALDWELL.
EDWARD WORTLEY.
GILSON MARTIN.
F. J. BRAMWELL.
JOHN COLEMAN.

The above extract not only does justice to he merits of our invention, but also points ut the causes which had prevented the arlier adoption of the "direct thrust." Up o that time, makers had done violence to he general laws of mechanics as to the corect position of the crank in relation to the ork, because it was incompatible with an rbitrary rule, for which they could give no atisfactory reason, viz., that in a reaping or nowing machine the crank should be placed long way from its work. We need hardly emind our readers that in a mowing machine n the "old system"—that is, with the crank laced otherwise than in the "track," the rank must be high enough to prevent cloging, and "considerably higher than the knife."

It was, therefore, by discovering a mode whereby the gearing-crank shaft and connecting-rod could be packed in a small compass, that we were able to place it on a level with its work, and thus obtain the direct thrust, which is the rule in all other machinery, from the locomotive or marine engine to the domestic sewing-machine.

Figs. 2 and 3 illustrate the "old" and "new systems" as applied to mowers.

It may be thought that even when the knife and crank are in a line, it is desirable to make the connecting-rods as long as in the "old system" machines, and this idea may naturally arise from the practice in other classes of machinery where a crank and connecting-rod are used; but it must not be forgotten that the knife of a reaper or mower is driven at a very high speed, whereas in most other instances reciprocating motions are very much slower, though even then, as in the portable and locomotive engines, engineers adopt the same proportions as ourselves between the crank and connecting-rod. Still, in a slow motion the weight of the connecting-rod is of comparatively small importance; and therefore, after securing the usual length, viz., three times the stroke of the crank, engineers have sometimes availed themselves of opportunities to give more length to the connecting-rod for the sake of reducing the angle of thrust, however slightly. In a mower where the crank is driven, say from 800 to 1000 revolutions per minute, if it were possible to increase the length of the connecting-rod without adding to its weight, some little might be gained; but it is found in practice that the additional weight which is inevitable more than neutralizes the effect of the slight reduction of angle attainable.

SUCCESSFUL APPLICATION OF "NEW SYSTEM" TO M'CORMICK'S REAPERS.

The arrangement of gearing above described, we first applied to our mowers with a success sufficiently attested by the great increase in our sales. We then (1867) turned our attention to improving reaping machines, and soon found that we had no difficulty in adapting our "new system" to M'Cormick's single rake reaper; and as the great Paris trial took place that year, and all best known reapers from America and England competed —including one of M'Cormick's own make, from his works in Chicago—there was the best opportunity of judging between the "old" and the "new" systems. A week's trial resulted in the award for our machine, of not only the highest prize, but the decoration of the Legion of Honour.

Having succeeded with the M'Cormick reaper, we next determined to improve the self-raker reapers, now in much favour in England, having vertical rake-shafts, and arranged to deliver the corn in sheaves or swath; and we found that, instead of meeting with difficulties, we were, on the contrary, thus enabled to overcome all the serious defects of the "old system."

As we have before shewn, it has long been felt that the cutter-bar of reaping machines ought to be as nearly as possible in a line with the axles of the two wheels; but in machines constructed on the "old system," the cutter-bar must be either before or behind the main wheel, because the connecting rod must be free to connect the knife with the crank-shaft, which is placed on the opposite side of the wheel. Some of the evils of this arrangement we have already described, and we will not dwell on them further; we have generally found one fault lead to another, and we have never found the adoption of a correct principle in one particular involve the sacrifice of what is right in another.

CHARACTERISTICS OF NEW SELF-RAKER.

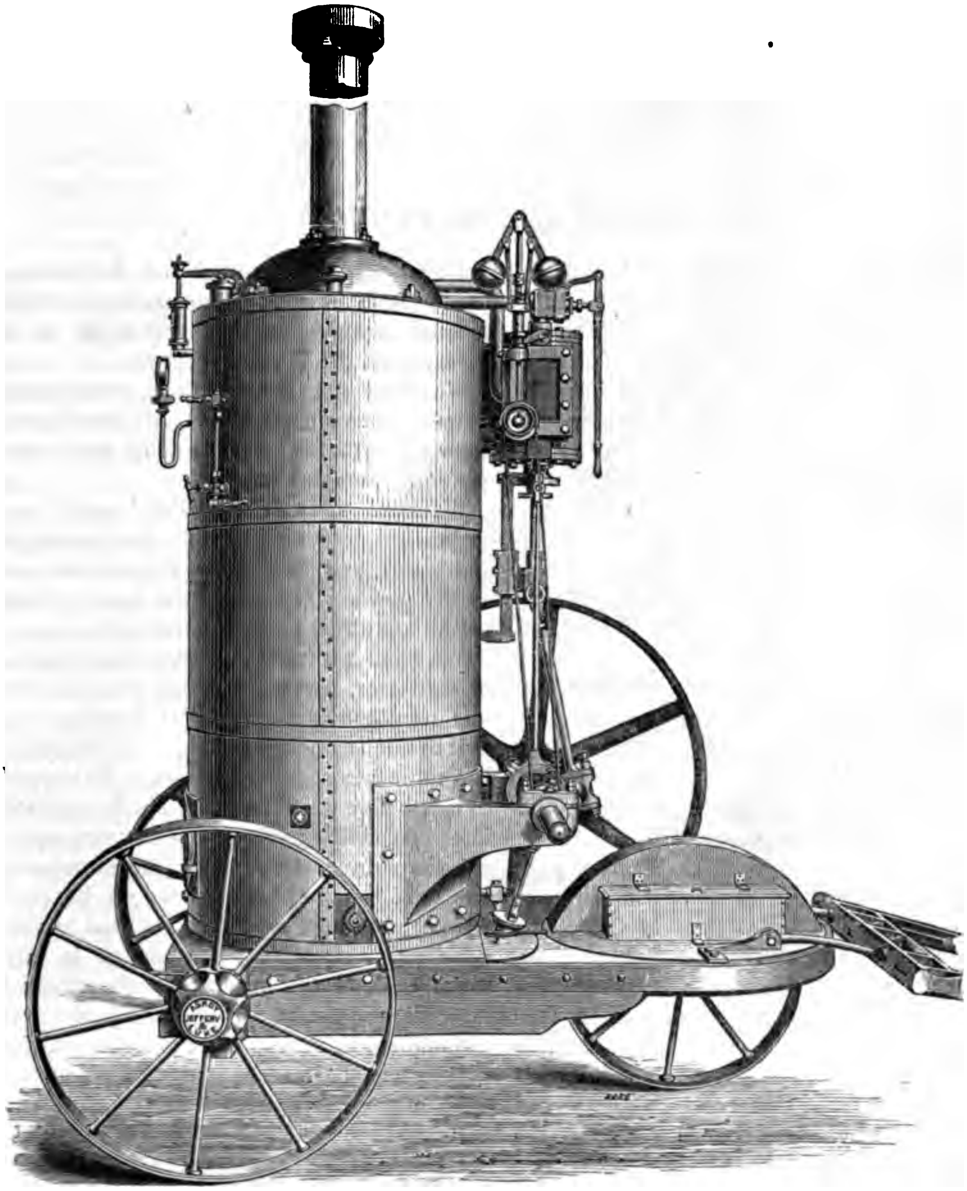
Our new self-raker reaper is constructed in strict conformity to our "new system" above mentioned, with additional patented improvements, of which the following are the chief characteristics, as illustrated in fig. 4.

It is an essential characteristic of our "new system" that everything should be balanced about the axle of the main wheel, and we apply it to this machine as follows:—The gearing for giving motion to the rakes is placed outside, and the gearing by which the knife is driven is placed on the inner side of the main wheel. The rakes revolve around an axis situate in the same vertical plane with the axis of the main wheel, and the knife-bar is also placed in the same vertical plane. The main wheel and the land wheel are also nearly in a line.

ADVANTAGES GAINED.

By this simple arrangement we obtain among other advantages, the following:—The rake-gearing counterbalances the knife-gearing, and their united weight, falling perpendicularly upon the centre of the main wheel, gives a steadiness of action and stability of balance. The centre of the rake being placed outside and immediately over the main axle, motion is communicated by a single pair of gear wheels, the smaller one being attached about the centre of the main wheel, and the larger to the rake-shaft. This is the simplest and most direct mode known to mechanics by which such motion can be transmitted, and, while exposing the fewest parts to wear or derangement, involves the least possible loss of power by friction. The position of the knife-bar, also in a line with the main axle, renders possible the placing of the crank on a level with the knife, which, in consequence, is driven by a "direct thrust." The position of the main and land wheels opposite each other secures so perfect a balance that no weight is thrown on the horses, nor is the machine heavy behind. It may be backed as readily as a cart. In carrying out the details of our machines, we have not been so enamoured of great principles as to neglect matters of apparently less importance, knowing that it is no comfort to the farmer whose machine breaks down to be told that the stoppage is caused by a matter of detail. We have devoted much thought to such points as the best material for fingers, and the best means of lubricating, so that on starting a machine to work in the morning, if the oilers be once filled, there is no danger from neglect to oil during the whole day.

PORTABLE VERTICAL STEAM ENGINE.]



Ashby, Jeffrey, & Luke's Portable Vertical Steam Engine.

OUR attention has been lately directed to a superior class of vertical engines, made by one of the Lincolnshire firms (Messrs Ashby, Jeffrey, & Luke, of Stamford). This engine appears to be well adapted for the light work required on the farm

As will be seen from the engraving we give, it is very simple in construction, and easily managed by an ordinary workman. The working parts are arranged so that they can be easily got at. The boilers are made on an improved principle, so as not to be liable to prime, a fault common in the ordinary verticals. These engines are also made portable by mounting them on strong wrought-iron wheels, with the front wheel moving in a circular frame. These portable vertical engines are very convenient for moving from one farmstead to another, if required, or from one part of the premises to another. They occupy little space, consume a small quantity of fuel, stand very steady at their work, and can be removed from place to place by one horse. We can, without fear, safely recommend these engines to the favourable notice of all farmers.

STEAM CULTIVATION.

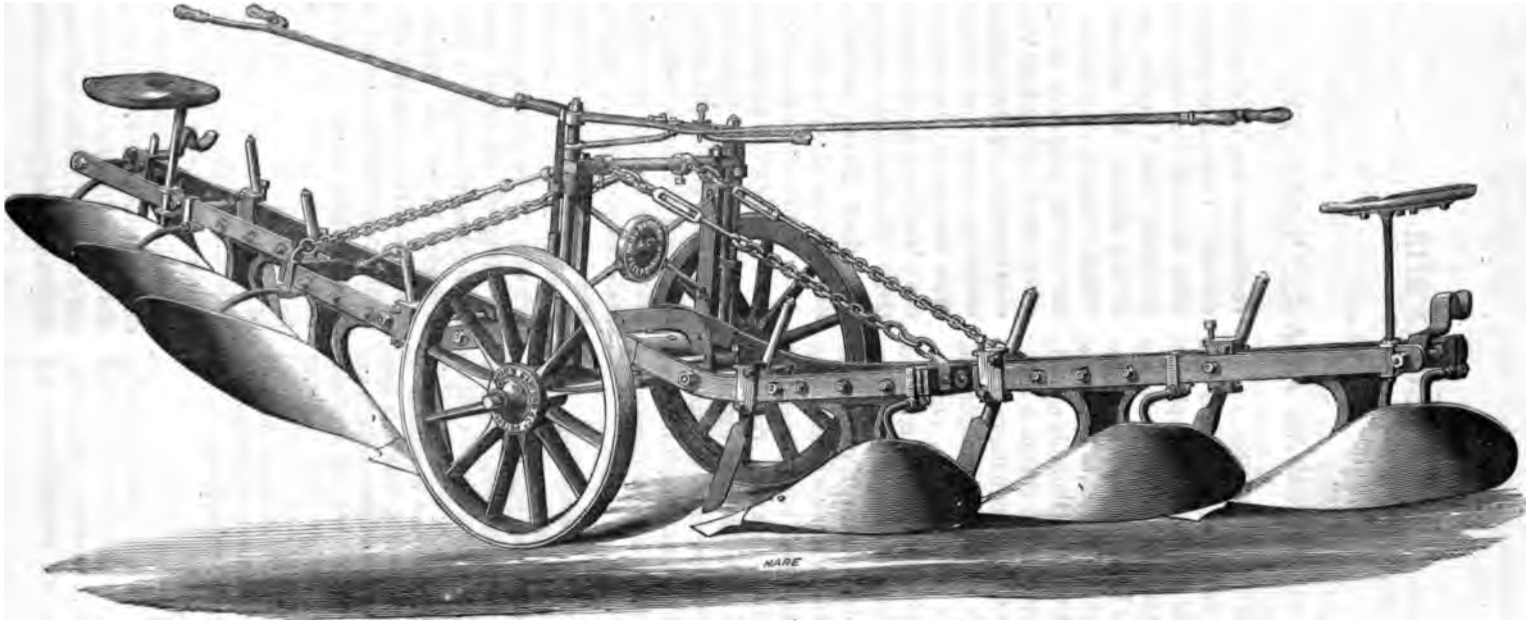
SINCE the carefully conducted trials at Wolverhampton, which may be said to have almost exhausted the question of steam cultivation, a large number of sets of steam-tackle have been introduced into districts where the "new-fangled" implements were looked upon somewhat askance before; and these localities, we believe, are destined to become centres, whence will be radiated *ropes* that will extend over the length and breadth of all the lands in the United Kingdom that are capable of being reduced to proper and profitable tilth, either by the roundabout system, or by the direct one. Steam cultivation alone (where it can be employed) in these days of keen competition for land, can produce the rent at a profit to the occupiers of it.

In the far north this has been recognized. Steam, under the supervision of Messrs Amies, Barford, & Co., engineers, Peterborough, has been applied in fields on the farm of Tochieneal. The anchor used is Campain's patent, an ingenious invention that has given great satisfaction wherever it has been used. A description of this anchor is scarcely necessary, as it has been seen in operation before; but we may mention that it is claimed for it that two men can be dispensed with by its use, and therefore a saving of 40 per cent. effected. In its trial in the north, its excellence, where it was in ordinary working, and not on *trial* before judges (practical everyday work we have always found the best test), was fully attested and duly recognized. Both Banffshire papers, the *Journal* and the *Reporter*, speak highly of it as it appeared on the Tochieneal farm.

We need not describe the roundabout system of steam cultivation. All our readers know it; not a few of them, under one name or another, employ it.

We need scarcely add that steam can propel or drag any kind of implement or instrument, and that Amies, Barford, & Co.'s motive power is as competent as any other to pull a grubber or plough across the soil.

We shall say nothing about the grubber, or cultivator, beyond the fact that when it was tried in Banffshire it did its work well, as it has done in other places. Of the plough—a three-furrow one—we have a little more to say, before we allow it to speak for itself in the engraving given on the following page. It is simple in construction, and the frame being made of parallel bars, instead of bevelled framing, a lighter weight is required to produce equal strength. The plough is very manageable at the headlands; the steerage is quick, and the holder has more power over the implement than in other ploughs of a like kind. The beams are expanding, and furrows of any width, from 8 to 11 inches, can be turned over. The plough makes a perfectly level sole at the limited depth of 4 inches, which, in ploughing for wheat, is advantageous, while the price of the implement is very moderate indeed.



Amies, Barford, & Co.'s Three-Furrow Plough.

The Farm.

FARMING IN EAST LOTHIAN.

NO. VII.—STEAM-PLOUGHING.

WE gave the names of those who were the first to introduce steam-ploughing into East Lothian, an example which has since been followed by Mr Roughead, Myreside, the property of Lady Susan Bourke, a farm we remember thinking admirably named, as it was nothing more nor less than a mire. Now, by a large and judicious outlay of capital, combined with excellent management, it is a very fine farm. Mr Forman, Duncrahill, and Mr Tweedie, Coats, both on Lord Hopetoun's property, have also steam-ploughs; likewise Mr Fortune, Elphingstone Tower, on Lord Elphingstone's estate. Besides these, a steam-plough has been started near Dunbar, a small district company having been formed. We have no doubt of the success of this scheme—and to prove it we extract the following paragraph from our local paper, the *Haddingtonshire Courier*, of last week.

> STEAM-PLOUGHING.—The steam-plough which was introduced into the eastern district of the county a short time ago, has already done good service, and given the greatest satisfaction to the enterprising shareholders. A few days of stiff drying wind has put the land into excellent condition for turning over, and the plough has been in pretty constant requisition. In the beginning of last week it was at work on a large field on the farm of Eweford, and the excellent way in which the work was done was not only creditable to the implement itself, but to those in charge of it. The workers, indeed, seemed quite delighted with the ease and precision with which they managed the iron horse, and they have taken to it as kindly as if they had all been born and bred engineers.

DOUBLE-FURROW PLOUGH.

Since the introduction of steam-ploughs, double-furrow horse ploughs have been tried in our county with fair success. Some farmers believe in them, but many do not; we confess our own opinion to lean to those who do not. They are of great use, we admit, for what we call "a seed furrow," either for ploughing "lea," that is, pasture land, grass, or hay stubble, for oats, or potato land for wheat, where a deep furrow is not required; but for the purposes of *real cultivation* for green crops, we cannot compare their work with the steam or the single-furrow plough, to which we often find it more profitable for some soils to employ three horses instead of two; and one good furrow enough for *all three.* The double-furrow plough is supposed, with three horses, to do the work of two single-furrow ploughs with four horses.

We lately had a discussion at our Haddington Farmers' Club on this subject, which did not throw much light on the question. "Facts are chields that winna ding," *i.e.*, that talk won't overcome, and a strong illustration before the eyes of the writer is this, viz., a first-class ploughman, who has gained many premiums for his skill, and whose saving being rewarded, besides farming a few acres, his own property, and renting about 30 acres of land adjoining, of soil suited above all others for this implement, cannot see his way to effect a saving by its use. There is no want of enterprise here, because for this comparatively small occupation he cuts his crops with a first class reaping machine. Now we have been told that one of the principal difficulties to be overcome is a disinclination on the part of the ploughmen to work them. We do not believe this. The arrangement, or rather machanism, of the machine is, to some extent, complicated, and our local smiths cannot repair its disarrangement or breakages. We do not disallow its utility for rapidly turning over the soil for a seed furrow, and would recommend every farmer to possess at least one or more, parts, we find them increasing day

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). VIII.—THE RENT OF THE LAND.

aluation already given of the several
in the county affords the fullest
tion of the aggregate rental of East
; but it need scarcely be added that
arate rental paid for different farms
ccording to the quality of the soil, the
; for markets, and other local con-
ons. On the estate of the Marquis of
lale, for instance, the rents vary from
£2, 2s. 6d. per imperial acre, the
being about £1, 7s., which may
to be low in comparison with others.
rd Tweeddale is not only a good land-
ut knows well the value of having
who can not only pay their rent
y, but who have some balance in
ut of which they can make improve-
On the other estates, the rents range
idely from their being paid entirely in
fiars' prices—a system which will be
ed as we go on. On Lord Hadding-
state, which embraces some of the
nd in the county, the highest rented
r crop 1870 would be about £3, 3s.,
e lowest £1, 8s., per imperial acre.
on an average of fourteen years gives
highest about 66s. 9d., and the lowest
. To account for these variations in
aders must take into account the hill
this estate, also on Whittinghame.
he Dirleton property of Lady Mary
Hamilton, the old leases are mostly
grain, payable by the average of the last
ears, one being annually struck off and
t added. This plan secures a fair
and prevents any very great rise or
Iere we cannot avoid saying there can
reater mistake, either for landlord or
than the system of paying an entirely
nt by the current fiars. As an illus-
the rent of a farm of 300 acres varied
,452 to £903 during the currency of
. These fluctuations are as much
a landlord's interest as the tenant's.
uth of this is apparent, and money rents are becoming more common, day by day. The rents of the farms in Dirleton parish vary. On the unexpired leases of Lady Mary Hamilton's estate, the average rent is about 50s. per acre. The last let farm is nearly 70s.

On Mr Balfour of Whittinghame's property, the farms range from 25s. to 55s. per acre, some of the principal farms on the estate being let in half money and half grain, which is undoubtedly the best system of all. To shew what may be taken as a fair test of the rise in the rent of land in our county since railways opened up our trade, we give, as an illustration, a farm on the Whittinghame estate, which had been re-let to the tenant. He died almost before the new lease had been entered into. The farm has since been advertised, and taken at a rent considerably higher than the re-valuation to the old tenant, also much less than highest offer. A very fine farm on Whittinghame was let two years ago, and an offer of £150 more than the rent which was accepted, was bid. Now, these are strong facts, and might be brought to bear in some of these anti-Hypothec Commissions, an agitation which, for the present, has simply caused a system of fore-renting to be introduced, by no means advantageous to the tenant.* The old lease of the farm to which we first referred was taken somewhere about the year 1853, at 40s. It is now let at 55s., and this may be taken as a fair average of the rise in rent in our county.

The highest rented land in East Lothian is what may be called the Dunbar district. From £5 to £6, 10s. per acre is paid. This is owing principally to the quality of the potatoes grown in this neighbourhood, which always command 10s. per ton more than the best grey soils. Suppose we take a 300-acre farm on which in this neighbourhood 50 acres *at least* will be grown, here you have, on an average crop, £4 per acre more for that sixth portion of the farm, and the feeding qualities of the land either the pasture or turnips are much better than other districts.

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* It is not to be understood that we coincide in everything said by our correspondent.

according to the extent of his occupation, for this purpose.

THASHING MACHINES.

We would direct attention to our thrashing machines. It is many years since the flail was cast aside. Our earliest recollection is associated with seeing two men using them for small portions of the stacks which had been left over of the previous day's work of the horse mill. It is more than an hundred years since the inventive talent of Mr Meikle brought forth a very good thrashing machine. An ancestor of Mr Fletcher, of Salton, gave him great encouragement, and in a very few years his invention was adopted by almost every farmer of any extent in the county. The power was principally horse labour. On every farm steading, a small circle was roofed over, with a large wooden framework underneath, to which three, four, or six horses were attached at regular distances. The horses being driven round a circle gave the motive power to the mill—a hard and sore and frequently fatal work, besides the great loss of time. Now-a-days, "thanks to the genius of Watt," we can thrash our grain, and at the same time have our horses employed in the fields. We have already said farmers are slow to adopt modern improvements. We are proverbially cautious. The first steam engine erected in East Lothian was by Mr Reid, Drem, in the year 1829 or 1830, a first-class 8-horse power condensing engine, which is still in the farm held by his son, Mr W. Reid, and is *even now* perhaps the most perfect engine in our county. This farm, as we already mentioned, is on Lord Hopetoun's property. The present tenant, Mr Reid, has devoted much attention to the machinery of his farm. Nearly every farm in East Lothian has now got a steam thrashing mill. The engines are mostly of 6-horse power. These mills can thrash from 40 to 50 qr. of grain in nine hours.

ADVANTAGES OF TRAVELLING THRASHING MACHINES OVER FIXED ONES.

We now regret that so much money has been spent on these fixed engines and mills, with buildings attached, because we have had introduced travelling thrashing machines into the county, one very enterprising engineer, Mr S. Dodds, Haddington, having four. Many farmers employ them in preference to their own fixed mill. The charge is £2 per day, including two men to attend engine and mill. We prove the advantage of this mill thus:—Take say a 300-acre farm, ten good days' work of this mill could thrash the whole crop for £22, including coals. Now, for a 300-acre farm, the cost of a fixed engine and mill, with the mere buildings for the machinery, would be £450. Take this outlay at 5 per cent., gives £22, 10s., and our engines require double the fuel of these travelling engines. Besides all this, we have at least £10 a-year to pay engineer and mill-wrights' accounts, and sometimes a great deal more. Then we question if the quality of the work is so perfect. Thrashing in the open air is much better for the work-people, and you can see in a moment if the grain is being properly taken from the straw. The only suggestion in the way of improvement in these mills we can offer, is to give them traction-engines. Many farmers do not use the mill, simply because they are afraid to send their horses for it. *It was from England we got our ideas of the advantage of these mills, and it is an Englishman who is the owner of the travelling mills used in East Lothian.*

Before leaving this branch of our subject, we have only to remark, that steam power must eventually prove our greatest and best auxiliary when new countries are being cultivated and new steadings erected. A steam plough with a traction engine, and a moveable thrashing machine, must be included in the estimate for stocking the farm, and instead of those comparatively useless range of buildings in connexion with our fixed mills. We will have a three-storeyed or two-storeyed barn, with easy access to the top flat, where the grain can be laid after being thrashed, and then run into the winnowing machines in the chambers below. By this a great saving of manual labour may be effected. It is the expenses of the farm now-a-days, which run away with all the profit, and do what we can

have pointed out the rents of different
s where the soil, at least a great por-
it, *was* naturally good, but there is a
leal of land in East Lothian naturally
A name like "Teuckit Moor," *i.e.*, a
where the pewit screamed perpetually
little more than a barren wilderness,
tes its former character, and we rever-
these antient names as we do antient
arks. It is spots like these and
neighbouring farms where, perhaps,
ost advance has been made since our
st fertilizer Peruvian guano was intro-
. Some of these farms can now com-
with our best—but under a totally
nt system of management. In former
when these farms were grazed, £1 per
was considered a high rent for the
You can imagine the description of
re when the grazier of some of these
once exclaimed when he came to look at
ock, "Feed—how can they feed? Why,
n with a whip could see and crack a
from one end of the field to the other."
the greater proportion of the grass in
farms is cut for hay, and will produce
y £10 per acre over a series of years, at
t of about 45s. per acre for top dressing,
t. Peruvian guano and 1 cwt. nitrate of
being considered the most profitable
re for this purpose. We need not go
im over all the estates in the county,
erely add that the rent of land in East
ian may be said ot average nearly 50s.
rmers should ever bear in mind it is the
nditure that runs away with the most of
rofit. First-class land returns back all
is given to it in greater proportion than
soils. The expenses of working a bad
are also much greater than a good one,
really, although it is quite possible to
too high rents even for the best farms,
must admit that much depends on
gement. One farmer would make money
e another would lose it. Three things
nand success, viz., ample means, skill,
earnest application to business.

. IX.—THE FIARS' SYSTEM OF RENTING.

eferring to the last paper, in which we give 50s. per acre as an estimate of the average rent of the land in East Lothian, we state this with some doubt as to its perfect accuracy, owing to the variations in the yearly rent of a great many of the farms in our county, from paying entirely grain rents, which are fixed by what are called "the county fiars." We will explain what the "fiars" are. There are twenty-five parishes in East Lothian, and from each of these a certain number of farmers are selected, who make returns of all the grain, "wheat, barley," and "oats," sold off their farms from harvest to the end of February. An average is then struck from all these returns, when those above the medium are classed as No. I., and are called the "highest fiars," the average of the whole being classed No. II., and those below classed as No. III., and most rents are paid by the second fiars.

In all classes an addition of 2½ per cent. is made, as no account is taken of grain sold for seed, or of the sales made in the spring and summer months. There is a great demand for seed grain from East Lothian, and if farmers carefully *separate their sales for seed* from what is sold for other purposes, then we hold the 2½ per cent. no more than what is just. There is great difficulty in doing this, as the seller cannot always be made aware of its destination. There was also another strong reason for the 2½ per cent. addition, viz., the higher prices obtained for the grain sold after the fiars were struck. In these times, however, the whole basis upon which calculations were made regarding the spring and summer prices have been turned upside down. The reason the returns were closed in February was to enable landlords to receive what is known here as the Candlemas rent. The two terms in Scotland when rents are payable, being Candlemas (2d February), and Lammas (1st August). The largest portion of the crop was sold before the fiars were struck, but prices ranged much higher during the latter half of the season.

We trusted in those days almost entirely on our home supplies, but wise legislation, combined with commercial enterprise, has overcome what were regarded as impossibilities, viz., the profitable importation of foreign grain, free of duty. These foreign supplies arrive now at the time when prices usually take a decided rise. We do not consider in any way unjust, an old system which every one taking a grain-rented farm in East Lothian knew to exist, and should have made his valuation accordingly; but would it not be better now, that the fiars should be struck from the returns of the whole grain sold of the crop for the year, whether for seed or not, without the addition of the 2½ per cent. A pretty fair estimate of the rent could be made in February, and a sum paid to account. We have never had it explained how those who are summoned to give their returns are selected; but it is understood that *by rotation* a proportion of farmers are summoned from every parish; and the system under which the fiars' prices of East Lothian are regulated seems more perfect than the Mid Lothian system.

In East Lothian, the *quantity* sold regulates the average. In Mid Lothian, the *number* of sales is taken into account. To illustrate this: 5 qr. sold at 50s. would influence their fiars' prices as much as 10 qr. sold at 100s. The only objection we have heard raised against the East Lothian plan of striking the fiars, is the addition of the 2½ per cent., the reasons for doing which we have tried to explain.

We remember hearing some talk, when in England, of a proposal being made to introduce beef and mutton rents on a large estate in the south of England. A system of this kind may be organized and rendered practicable, but we question very much its advantage either for landlord or tenant.

Besides fixing the rent of a great deal of the land in Scotland, the fiars' prices determine the annual income of the majority of our clergy of the Church of Scotland. The stipends of our ministers are paid in chalders of grain (19 sacks ?), convertible into money by the county fiars. We think this a very bad plan, as it must make such a variation in the yearly income. We remember an instance where the widow of a clergyman received as much for her retiring half, as the fiars allowed for the whole stipend of the new minister next year. So much for the fiars and their fluctuations!

We have written of the rents and the systems under which they are paid. We now come to notice the factors or land agents on the different estates. There is much responsibility in the office, and difficulty in discharging the duties to the satisfaction of both landlord and tenant. Of our East Lothian factors we can with perfect confidence state we have gentlemen of first-rate agricultural skill, who can shew, where they have the management of home farms, both the most approved modes of culture as well as the proper expenditure of capital and useful employment of labour. As the medium of communication between landlord and tenant, much must depend upon how they represent matters of great importance to both.

We have sometimes heard factors condemned as being entirely "the laird's man;" but tenants should remember the factor receives his income wholly from the landlord. He is placed there, as it were, to protect or guard the landlord's interest, and the factor who does this best, is one who ever tries his utmost to blend, as it were, or harmonize the interests of both. None of our large proprietors are so conversant with practical agricultural details as Lord Tweeddale—we hope some day many of them may be so; but we feel certain their interests are well looked after by the gentlemen to whom the management of their estates has been entrusted.

NO. X.—TERM OF LEASES—PRACTICAL AGRICULTURE.

Before entering into full details of the practical agriculture of East Lothian, it may be as well to mention, first, that nearly all the land in Scotland is held under leases of from fourteen to twenty-one years. In East Lothian, the common term of a lease is nineteen years. For the explanation of your readers who may not understand, we may mention that a lease is a most formidable document, written out with great minuteness of detail, which sometimes makes ambiguity in the meaning, and gives rise to frequent passages-at-arms between in-coming and out-going tenants. Arbiters are agreed upon, who appoint an oversman, whose decision is final in all matters of valuation ; also, to avoid litigation, all doubtful meanings in the clauses of a lease are settled by their arbitration. When a farm is let, two copies of the agreement are written out. One is held by the landlord's agent, the other is kept by the tenant, both being mutually bound to fulfil its conditions. The terms of these contracts vary considerably in East Lothian. On some estates, what may be called the protective clauses for the landlord's interest are much more stringent than on others; but in all leases a system of cropping is laid down. Thus—"The rules of good husbandry must be practised, and in no case shall *two white crops*, *i.e.*, two cereal crops, *follow each other consecutively.*" It would only weary your readers were we to enter at length into the many arguments for and against these prohibitory cropping clauses in leases. We think they are, to some extent, as essential for keeping up the proper cultivation of the soil, as our code of civil laws are for keeping in check those who have indistinct ideas of the *meum* and *tuum* practices of our land. Our laws are made for the good as well as the bad. The bad only are punished; still, to some extent, the good are made to suffer. Our *simile* may be a strong one, but we hold these restrictive clauses in leases are necessary, for all are not good farmers, and do not recognize the fact that to farm well for *the present*, they lay up stores for *the future.*

We would here remark, however, that these cropping restrictions might be limited to the last rotation of the tack (*i.e.*, lease). If high rents are to be paid, liberal covenants must be entered into, and during the first three rotations of a lease a tenant can only farm profitably by doing his utmost to perfect the condition of his farm, and where this has been done, he may find his only profit (and may be only a partial return for large outlay) in the last few years of his lease. These remarks apply to farms entered into when they had been badly farmed. Mr Brodie, of Abbey Mains, who was justly considered one of the best authorities in all agricultural matters, held it to be the most profitable system to farm as well at the end as at the beginning of a lease. How he practised, is best illustrated by the success of those who have since occupied the different farms in East Lothian which he had cultivated.

A good deal has been written and said on the subject of tenant-right, and in cases where leases have not been renewed, and from the improved condition of the farms, a large increase of rent has been given, some compensation for unexhausted improvements is surely due to the way-going tenant. The outlines of the mutual benefits to both landlord and tenant are very clearly delineated in a letter on the subject which appeared lately in the *Haddington Courier*, written by Mr Kinloch, of Gilmerton. There are some instances where a great deal of money has been sunk in permanent improvements, which did not repay the tenant during the term of a lease, of which the landlord and new tenant reap the benefit during the next tack; but these instances are few and far between on most of the large estates in our county. The leases have been renewed on most equitable terms, and in order to allow for the unexhausted improvements of the occupants, the re-valuation of these farms have made considerably under the rents which might have been obtained had they been offered for public competition. We hold this to be the best kind of tenant-right. There should be in agriculture, as in every other branch of industry, a mutual trust and dependence on each other. It is much to be deplored that agricultural harmony should be so often jarred and broken, when such subjects as hypothec, the Game-laws, and tenant-right are taken up and preached upon by candidates for mere electioneering purposes, by men who may have passed nearly all their days in cities. Farmers are hurried into pledging their votes, often without consideration. Hence much of that disunion which has been made to exist between landlord and tenant.

Having thus passingly treated of leases,

with a few observations on matters connected with them, we now attempt to give a sketch of the practical details of our agriculture. To illustrate this we will take, say a 300-acre farm in the middle district of the shire, of average quality of soil, and conveniently situated for marketing its produce. According to the stipulations in most leases, one-sixth of the farm is bound to be always kept in grass, two-sixths in green crop, under drilled husbandry, and the number of acres in white crop must never exceed one-half of the whole farm. The rotation followed in this case would be (were the fields all exactly of the same size) 50 acres of grass, 50 acres of oats, 50 acres of potatoes, 50 acres of wheat, 50 acres of turnips, and 50 acres of barley, with which grass seeds would be sown. I need scarcely mention that this exact system is never followed out to the exact proportions here given, owing to various causes, some of which are the variable nature of the fields, both in regard to their extent and quality. It is found advantageous in some fields to graze two or three years; on others, beans are found more profitable than potatoes; others, again, substitute barley after grass instead of oats, and where there is not the command of large supplies of manure, turnips may be found more advantageous than potatoes. It is impossible to lay down strict rules for all, but a uniform system of cropping will, in the long run, be found most advantageous, and every farmer on entering to his farm should have perfect freedom in regard to his mode of cropping, to enable him to arrange his fields in order to grow every year, as near as possible, the same proportions of the various cereal and green crops we have mentioned. In the eyes of some farmers, exception may be taken to ploughing up all the grass every year, and we would not recommend the practice. Besides, on every farm there is always one field allowed to lie at least two years. This is found necessary for the sheep stock in spring. It will be found on every well managed farm the proportion in grass is larger
than what is stipulated for by the leas
it is well known that East Lothian is
good grazing county, from its want
ficient moisture. Still, sheep were fo
fatten splendidly during those dry su
we have had of late, but a great expen
incurred for artificial food, an outla
ever, which will be returned. Cattl
during the summer months are nearly
on cut grass and cake in the feeding c

Here is a point it were well to co
viz., the advantage in trying to produc
beef and mutton, and instead of sp
such large sums annually on artificial m
to lay out a great proportion of this
in feeding substances, which would
the land after having fulfilled its firs
pose of producing more meat. The
be no doubt of this being the true s
We cannot compete with the cheap
and low rented land of foreign count
the production of grain, but we ought
to be able to hold our own in the mea
kets of our land. It may be aske
don't we do it? Simply because for t
four years it would disarrange incon
expenditure, and few farmers could aff
large outlay for extra stock, besides
to wait during almost the whole cours
rotation for the benefits of the change.
depend upon it a time will come when
three-fourths of the sum spent in a
manures will be spent on artificials, whi
only reach the soil after being used for
food. Every encouragement to ado
system is offered at present, from th
prices of beef and mutton, whilst the i
ing expense for artificial manures a
high price of labour discourage the
In writing on the practical agriculture
Lothian, we will take the various
seriatim, as they succeed each other
rotation. We will in our next begin w
oat crops, giving our opinion of th
method of preparing the land, sowi
grain, and the varieties which are con
the most profitable in the different d
of the county.

THE SUCCESSFUL CULTIVATION OF ROOTS.

By Mr James Withers.*

AY first of all state that it was entirely
owing to the prizes awarded for roots
s club, and others of similar kind, which
ed me to think of and to afford me an
tunity of forming an opinion as to the
number of roots required to the rod to
e the greatest acreage weight. And
by comparing one field with another,
heir respective numbers of roots, and
weights during a course of years and
gh various seasons, it assisted me in
ng to a conclusion as to the right num-
f roots per rod to make up the greatest
it per acre. This is evidently one of
est seasons for a plant of all kinds of
we have had for many years past; and
is possible this season to secure any
nt of plants to a given space of ground;
t, I do not know a season when a good
of all kinds was so easily obtained.
in taking a survey of the root crop
passing from field to field, and from
to farm, we might fairly expect to
seen one uniform system carried out with
d to the numbers of various roots, and
espective distances of those roots. This,
ver, is not the case, for great irregularity
ils throughout the whole district. This
occasioned by the hoe in thinning or
g out the plants. I do not, by these
rks, condemn the hoe for this purpose,
s thinning is necessary, it is also neces-
that we should know how far such
ing should be extended. It seems at
sight to be a subject of very little import-
, but when we find that some tons per
are entirely dependent on the right
er of roots, it also being often in the
r of the hoers to leave any stated quantity,
st be of some importance to know what
quantity should be, in order to produce
est possible crop. At all events, it seems at present a subject very imperfectly understood, or very badly attended to, as within the district of our root show, facts prove that the number of swedes vary from 80 to 150 to the square rod, and mangold and other roots quite as much, and also that small or few numbers seldom gained prizes.

WIDTH OF ROWS FOR SWEDE CULTIVATION: THE NUMBER OF ROOTS.

We will, if you please, first of all fix our attention on the swede cultivation, it being, perhaps, the most valuable part of the root crop. At some early period of our club, say eighteen or twenty years ago, it was often remarked that the swedes drilled at 24 inches seldom gained prizes, their acreage weights being too small, while those with rows of 18 or 20 inches most frequently did so. Experience of late years has, however, proved to me that the reason was not simply because they were placed too wide from row to row, but because the plants were too thinly hoed in those rows, thus leaving about 80 or 90 roots to the rod, where at least 120 or 130 should have been. And as the 24-inch rows now most frequently take the first prizes it must, I think, shew to us that the crop does not so much depend on the width of rows as on the right number of roots to the rod or acre; and it also goes to prove that the 24-inch rows have in past years been too thinly hoed, and if drilled wide between the rows the swedes should be left more thickly planted in those rows to make up the deficiency, or a loss in acreage weight will be the result. The greatest weight found by the judges amongst all the competing fields for prizes within 15 miles of Botley for the last year's root show for 10 acres of swedes, was a field of my own, which was drilled at 24 inches and 127 roots to the rod. The manure used was 3 cwt. of bone superphosphate, purchased of Mr Spooner, and 60 bushels of

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ad before the Botley and South Hants Farmers' ashes per acre. We sometimes, however, find that excess in numbers will produce a very fair crop; and we also find some cases where few numbers have done the same, and in comparing field with field we seem at times puzzled to ascertain which is right—whether the thin or the thick planting. And although both extremes have at times produced very fair crops, there is a probability that had the medium been adopted there would have been some tons to the acre more in both cases. And neither of the two is in my opinion right, it being better to avoid the two extremes, and follow that which has done the best through a course of ten years. I have, therefore, come to a conclusion as to the right number of roots, which, for early swedes, in my opinion, is from 120 to 130 roots to the square rod, and those of later sowing might be 140. The 24-inch rows, at 12 inches in the rows, would yield 136 roots to the rod, and each swede weighing the small weight of 2 lb. only would yield 19 tons 8¼ cwt. per acre, or root at 2½ lb. each would be 24 tons 5 cwt., and it is but seldom that we produce that weight. As regards the right way of placing the roots—as to whether they should be 24 inches one way and 12 the other, or 18 inches each way (as both would yield the same number of roots)—I am not so well prepared to give an opinion, but I am inclined to believe the latter would be likely to produce the greatest weight provided the horse-hoe could be used; but as 24 inches is the nearest to ensure good horse-hoe cultivation, and we cannot afford to sacrifice the use of that implement, I must as yet give the preference to the 24-inch rows.

CONCERNING MANGOLDS—WIDTH AND THICKNESS OF PLANTING.

We will now turn our attention to the mangold. The plant of mangold was, or should have been, a good one, but we find in it the same irregularity of planting, or even greater, than that of the swede, varying in numbers from 80 to 150 to the square rod, and although the thin planting will produce very fine roots, which catch the eye and appear very beautiful when growing, yet I do not believe that the extra size or weight of such ever compensate for the deficiency in numbers, and, even if they do so, I believe that three roots of medium size would, if analyzed, be found to contain more nutriment than two of the same weight. Moderate thick planting renders the roots more shapely, and are more easily cleansed and prepared for the cutter, and with much less waste, and the same would apply to swedes and other roots. And I believe that mangold should be grown in numbers very nearly approaching that of the swede. I should recommend the rows at 24 inches and about 14 inches between the plants, or about 110 or 120 roots to the rod; but this root, like all others, should be regulated in numbers, according to the time of sowing—the late somewhat thicker than the early planting.

DRILLING TURNIPS AND CARROTS.

The turnip plant for the early part of the season should, in my opinion, be about the same in number as the swede, or about 130 roots in the square rod. But as the sowing of turnips is extended over a long period, the right number of roots must depend very much on the time of sowing, taking care to increase the number as the season advances, varying from 130 to 200, or even more; and stubble turnips, if hoed, should be from 260 to 300 to the rod, or at the least one to every square foot. I have more than once observed that where only part of a field of stubble, or any late turnips, have been hoed, those left unhoed have produced by far the greatest amount of sheep food, which was the effect of too thinly hoeing. Carrots, if drilled at 16-inch intervals, and from 4 to 6 inches between the plants, 4 inches would yield about 600 roots to the rod, and 6 inches would be about 400, and I believe 500 roots of carrots to the rod to be about the right number to produce the greatest bulk per acre in most cases. Cabbages and kohl rabi I will leave to others more experienced than myself.

HOEING SEASONABLE AND PROPERLY.

We find within 10 miles of Botley, the range of our root show for the last season, that the swedes vary in numbers from 79 to 156 roots to the rod, and that 127 was the heaviest of all, and 121 the next heaviest acreage weights. The mangolds vary in numbers from 77 to 151 roots to the square rod, and 89 and 151 were the heaviest. The carrots vary from 400 to 800 roots to the rod, and 575 proved the heaviest. Thus we find there is a very wide scope in practice with regard to the numbers of roots and the distance of those roots:—and as the few numbers, or thin hoeing, predominate, and seldom gain prizes, I believe that many or all of us have more or less been guilty of too thinly hoeing for some years past, and this affords me a place to say a word or two on this part of the subject. The hoeing business has very much to do with the root crop irrespective of numbers and distances. The work of both horse and hand hoe should be pushed forward as early as possible, and even in bad wet seasons it will not do to wait. Weeds will grow, and most in wet weather, and are much easier destroyed while in a state of infancy. Too much waiting for fine weather proved the bane of the swede crop in many cases which came under my notice; and many a field which promised well in their early stages became choked with weeds and stunted in their after growth, and the hoeing was also rendered much more expensive from the want of earlier attention. to them.

Leaving the largest plants is another thing worthy of our notice. The difference in two men's work in the same field is sometimes very striking; one of whom, leaving the largest plants while thinning or setting out, and the other regardless of such, more frequently leaving the small ones. This is another evil for which there is no after remedy. It is therefore evident that our practice with regard to numbers and distances embrace a very wide scope, and consequently afford a wide field for observation.

ERADICATING WILD OATS.

A CORRESPONDENT of the *Toronto Globe* gives us his experience on the above subject. He says:—"To destroy wild oats is one of the most difficult tasks in agriculture; but, like most other things, it can be done, provided the proper means are used. I have had many years' experience in contending with this most noxious weed, and have come to the conclusion that it is absolutely necessary, in order to succeed in the destruction of the wild oat, that its eradication must be the first thought, and must be prosecuted altogether irrespective of the amount of trouble or apparent sacrifice involved.

Wild oats never rot. The seeds will lie below plough guage for fifteen years, and probably twice as long, and directly they are brought to the surface and within the influence of light and air they will grow as well as if just thrashed. It therefore follows, that no sooner have you eradicated all that are near the surface, than from an accidental depression of the plough, up comes from below an abundant reserve of seeds, which within a week are all as green as if never buried at all. These are facts, and cannot be denied.

Now, it follows that any chance of destroying this pest lies altogether in getting the seed raised to the surface to vegetate, and by repeatedly killing all that grow, at length to get rid of all that can come from this source. Then, when there is little danger of burying fresh seed (that may have ripened during previous operations), let down the plough to its deepest gauge, and bring up all that you are ever again likely to disturb, and proceed to treat them as you formerly did those that grew at that time on the surface.

You will naturally say, "What an endless piece of work; it is more than the land is worth;" and so it would be, but the act of eradicating the wild oats by all this culture and care, will also bring the land into splendid condition. Meantime, to succeed with certainty, you must not have crops on the land by which the oat can get time to go to seed; and you must also recollect that if you cut down a wild oat before it has borne seed, and whilst the stalk is yet green, it will throw out abundance of seed shoots, which, although they may not reach more than 6 inches in height, and sprout as late as harvest time, say the end of July, yet before winter sets in this plant will have matured seed that will grow. I have often seen this exemplified, and gathered seeds that would grow well, the sprouts that bore them not being more than 6 inches high, and the parent stock having been previously cut down to prevent ripening its seed in July. It follows, then, that to commence destroying this pest with any chance of success, say after harvest, the land must be first lightly ploughed or cultivated, say about 2 inches deep, and afterwards well harrowed; all seeds dropped at harvesting the previous crop will thus be made to germinate, and all young plants, or old ones, yet willing and ready for future mischief, will be pretty well done for. Directly the field is green again, and all seed within influence of the air has germinated, plough them under a little deeper than before. This must be done before the frost sets in. This, however, will not kill them at that time; they will come as good as ever in the spring about May, but it will retard their growth most materially. Now, some crop may be sown, like potatoes or roots, that requires cultivation, or very early peas may be dragged in, without ploughing, say as early as the first week in April. Peas of this kind, and thus sown, will harvest by the first week in July, and by this time the oat will be 4 feet high, and in full bearing, but the seed will be green; yet a great deal of it will grow even then. Cut the peas, and thrash them in the field. Do not on any account haul them home. Stack up the straw, and carefully protect it from the weather. Fence in ½ an acre, and feed the straw there, and then to sheep. By this course you will have a crop from the land, and the straw, and you will have the only animal to consume it that can kill a wild oat by digestion (with the exception of a bird). The second chewing that sheep give all they eat, will effectually destroy all the seed they may swallow unmasticated. If you haul home the peas to the barn, you will fill your manure with seed, and thereby seed every field you convey any out on. If horses or cattle eat the wild oats, they will grow afterwards quite freely.

Proceed again the following year as you formerly did, and you will probably thin out the crop of wild oats the next year to a great extent. But now persevere; do not "let up" on this pest because you have a few only. In a year or two they will be as bad as ever; therefore stick to it for three or four years at least, and after that time you will only have to go through the standing grain and pull a few stalks here and there, and shortly afterwards the cure is complete. But any farm that is once overrun with wild oats will always be subject to a return of the disorder. Just on account of the extreme vitality of the seed, pasture or hay will not kill one seed, even if persevered with for ten years. Directly you plough you will have thousands again, unless you proceed as I have pointed out.

I have a field that has lain in grass pasture and meadow upwards of twelve years, and if I were to turn up the sod there would come up a splendid crop of wild oats; and to my certain knowledge not one plant has been seen for the above term of years.

THE POTATO DISEASE.

By G. A. Dean, West Worthing.

ITHERTO all the attempts of scientific men to throw light upon the of either the cattle or potato disease been unsuccessful, and in all probability rigin of both will remain to us a mystery be unveiled. Various theories have propounded concerning the causes of diseases, but not one fact has been lished that is calculated to prevent their pearance.

ongst the conflicting opinions which been given respecting the potato disease, revalent one is, that it proceeds from an ural combination of the elements. This of argument is highly specious and sing, and safe from contradiction, ise the constituent qualities of the sphere has never, and can never, be red by man. It requires something than fanciful conjecture before we can t to a theorem unsubstantiated by s, and opposed to the general laws by the universe is governed; it might also id contrary to our reasoning faculties. st be doubted whether in the diseases ffect the human species, the lower order imals, or the vegetable kingdom, the or has inflicted a penalty which is not power of human prudence to escape or prevent.

we take further view of what may be d the philosophical part of this question, be found that neither the general order universe nor the supposed constitution elements allow us to infer that there anything of the deleterious nature in ir which can have caused such great ction of the potato crops.

s not to be wondered that the casual er has asserted that the potato disease een occasioned by miasma, when the al appearances only of the diseased plants are considered, as in some ces the stems and foliage have been affected, while the root appears to have remained sound. But such observers forget that the germ of the disease may have been implanted in the tubers, and thus rendered them incapable of maturing the leaves and foliage. As therefore we cannot fairly accuse the atmosphere of generating the disease, and as there is no knowledge possessed by man whereby the origin of the disease may be traced, the most sensible thing for farmers to do, is to try and prevent the disease from again making its appearance in our potato fields; and recollect, it is better to prevent than to cure, and often far more easy to do so. Too much care to prevent the potato disease from re-appearing cannot be taken, as the potato is our most valuable esculent—whether as smoking in solitary importance on the labourers' humble board, or in its customary place among the viands of the wealthy, the potato is equally welcome; it cannot, therefore, excite surprise that it has always claimed the particular attention of agricultural experimentalists.

The varieties of this most nutritious vegetable are numerous (as most persons present know), and they differ in the times of maturing, some arriving at maturity early in the autumn, others later; they also differ in form, colour, and quality. It should, moreover, be remembered that some varieties improve, others degenerate, if removed from one district to another. There are some excellent varieties grown in Ireland and Scotland, which, when removed to this country, degenerate and become inferior to many other sorts commonly cultivated here, and *vice versa*. No variety should be cultivated which uselessly expends itself in the production of seeds, or in supporting full-grown blossoms, unless it possesses some very valuable redeeming properties. By pinching off the blossoms, an extra ton of roots per acre may be obtained at the cost of a few shillings:

and be it remembered that blossoms, thence seed, is that part of a plant to which the ultimate effects of nature are always directed, and that the greatest part of the nourishment must be devoted to it in order to bring it to maturity.

The largest produce will generally be obtained from varieties of rather early habits, and from those bearing moderately short stems. In varieties producing tall stems and much foliage, much time is necessarily lost in conveying the nutriment absorbed from the soil, by the tuber, up the stems to the leaves, and thence down again to the tuber in the form of sap.

Moderately early planting is best, but the proper time for planting must be governed by climate, soil, and situation. The length of time which the varieties of the potato lasts is from twelve to fourteen years; but the tubers of every variety should be changed about every third year; if continued for a longer period, it may be that the crop suffers both in quantity and quality, as the tuber itself becomes debilitated as seed.

I have watched the arrival, progress, and departure of the potato disease since 1847, and have arrived at the conclusion that whenever it makes its appearance in the foliage and stems, it is too late then to arrest its progress. All precautions against this disease should therefore be taken before the tubers produce stems and foliage.

I will now explain the nature of the precautions which I consider every cultivator of the potato ought to take in cultivating it; but I will first observe that when, in 1845 and 1847, the potato disease was raging in Ireland and various parts of the United Kingdom, this district was so free from it that large profits, I might with propriety say small fortunes, were made by those farmers who then cultivated the root extensively. Latterly it has been more prevalent in this district than in most other places; let us, therefore, try to discover some means whereby we may be enabled to eradicate the disease, or at any rate, reduce the evil effects arising from it.

It has often struck me that the potato is cultivated in this district too frequently on the same land, so that the land thus cropped has tired of growing it, as it does of growing frequent crops of clover and other crops, and the reason why it does so, is because the same description of plant, by extracting the same description of nourishment from the soil, exhausts the latter of those ingredients requisite for the vigorous growth of the plants it is called upon to grow.

It has also struck me that the farmers of this district do not change their seed often enough, and that when they do change it, they are not sufficiently careful in obtaining it from a suitable locality.

Another important consideration is, proper selection of the tubers to be planted, also their character. The seed selected should be raised in a lighter soil than that in which it is to be sown, and be brought from a district where the temperature is higher than it is here, and the rainfall less; it should, moreover, be obtained from land that has not been heavily manured.

I have frequently observed, too, that the tubers planted in this district are small and whole, whereas they should be moderately large sized potatoes—cut, but not small. Large cuttings produce large potatoes; small whole potatoes the reverse. But whatever size the cuttings may be, they should be cut two or three weeks prior to planting them, that the surface cut may be enabled to get dried.

As we are subject in this district to frosts late in the spring, and to heavy rains in the latter part of the autumn, my advice to you is to plant rather earlier varieties, but not before the middle of April, when, if large sized cuttings be planted, should a late spring frost nip the stems or foliage of the growing plants, there will be in the tubers a reserved supply of germinating power which will afford the means of supplying stems and foliage in place of those destroyed by frosts. With a small whole potato, as seed, the germinating power of it will be so largely drawn upon by the first set of stems and foliage, that very little power will remain in the tuber to produce a second set of stems and foliage, consequently, the crop becomes a failure.

guard the potato crop against disease, ust neither plant late nor very early, ou should plant early varieties; these d not be of that class which bear top- immature foliage, as such foliage not akes nourishment out of the tuber, but it falls down precludes access of the sun ir to the soil; so that the soil is kept in tinuous state of darkness and dampness, is extremely prejudicial to the young rowing potato, and in wet seasons may bly generate the potato disease.

, light, and air are essential to the luxu- growth of every description of plant ated upon a farm. I therefore strongly mend you to plant your tubers from 36 inches from ridge to ridge, and 9 inches between the plants; you will in all probability, harvest your crop in lthy state, while the produce of it will rge, and the quality of it good.

e best mode of preparing the soil for oes is to plough it into ridges early in nn; and if you use farm-yard manure e crop, spread this between the ridges cover it up with the plough. At sowing split the manured ridges, put in the and with it artificial manure (if you ny), then close the split ridges, cover ur seed by means of a double-breasted h, and press the ridges down with a orse roller.

reading manure in the spring, and plac- our potato plants on the top of it, is lated to generate disease in the tubers. moreover of opinion that the tubers and otato crop are far better without a heavy ing of "muck" than with one, if plenty ificial manure of the right sort be used, he land itself in good heart and condition. The ill effects of heavily "mucking" in the spring for potatoes may be seen by examining the potatoes grown by market gardeners around London. These men grow very heavy crops of both early and late potatoes, but the quality of both is inferior to those grown in this district, and elsewhere—they are generally of either a watery or waxy character, and all but flavourless.

It is probable that stimulating manure, like "muck," acting with the hot days of summer, may force the bulb to an unnatural growth, which, when followed by very wet weather, and the soil shut out from the sunlight, in consequence of excessive foliage, may generate disease and rottenness. I believe that dung juice has its share in contributing to the potato disease, as well as excessive foliage. I further recommend you to lay your land dry, and use as little muck as possible—or better, perhaps, to use none at all.

I have been very successful in growing sound and full crops of potatoes when I have used the following compost—viz., ground bones, 1 cwt., dissolved with 40 lb. of sulphuric acid; sulphate of lime, 1 cwt.; sulphate of ammonia, ¼ cwt.; nitrate of potash, ¼ cwt., mixed with twice the bulk of burnt soil or ashes.

I have not had time to allude to the after culture of the potato, and I have only been enabled to write thus much from having recently deeply considered the culture of the potato in the work I am now publishing on the "Culture, Management, and Improvement of Landed Estates." If the reading of this paper should be found in any way beneficial to you, it will be a source of gratification to me, and I shall feel that it has not been written in vain.

THE SELECTION OF STOCK.

By Mr DOUGLASS, Culsh.*

I SHALL commence my remarks by stating a few general rules to be observed by breeders of cattle, horses, sheep, or pigs, as I hold that they are alike applicable in a greater or less degree to each of these classes of animals.

CATTLE.

(1.) When there is a defect in the female, endeavour to put her to a male that is superior in that point where your female is defective. For example, if your females are deficient in size, get a strong male; female short in the body—a lengthy male; female long-legged—a short-legged male; female rough—male, fine; and so forth. (2.) The introduction of fresh blood from time to time. Though aware that Bates, Booth, and the Collings held a different opinion, and were, under exceptional circumstances, successful, yet I think this by no means establishes the system as the safest and best for general use, and I consider that the great preponderance of evidence adduced from experience establishes the fact that breeding from too close relationship is, in the long run, detrimental. (3.) The particular breed of animals best suited for the farm or pasture must be judged of by the farmer or grazier according to the district or climate in which they are to be kept, but in breeding any of the animals, due weight ought to be given to the five general rules which formed the subject of discussion at our first meeting, viz., (1.) Pure blood; (2.) A high strain of blood; (3.) A sound constitution, free from hereditary disease; (4.) Substance, symmetry, and quality; (5.) A docile temper.

As the object of the farmer that wishes to improve his stock is how to do so in the shortest possible time, and at the least outlay of money, though diverging, perhaps from the subject proper, yet as it is intimately connected with it, I shall make a single remark. As it is the generally recognized maxim that the exterior form partakes more of the conformation of the sire than the dam, and as one sire will to some extent improve the whole of each year's stock, while a female gives but one superior beast, I would say procure superior males at whatever cost, and should they be too expensive for the size of the farm, let two or three farmers join in the purchase and keep of one animal.

Commencing with the cattle, I shall enumerate a few of the general points of excellence in a bull, whether black, polled, or shorthorned. (1.) A neat formed head, clean in muzzle, broad between the eyes, prominent placid eyes, well set on ears, and fine, and, if short-horned, a thick, short, flat horn hanging downwards, and liver-coloured nose. (2.) The neck clean and tapering towards the head, and of an ordinary length. (3.) The chest deep and wide, with full bosom, affording plenty of space for the vital organs to discharge their duties. (4.) A broad, straight back, well arched ribs, strong in muscles above the knees, fine in the bone below the knee, plenty of flesh evenly laid on, slack, mellow skin, with plenty of soft, downy hair, a well set-on tail, not too thick, and a good toucher. These, I believe, form the leading characteristics of an animal easily kept, and which arrives at early maturity, but, to complete the improvement of the stock, it is necessary to pick off inferior females as fast as possible, and in doing so, with good sires, and with proper care and attention, the stock will so gain for itself a name. I do not enter upon the merits of the different breeds of cattle, as I consider doing so would be unnecessary after our former discussion.

SHEEP.

I do not consider it necessary to discuss the merits of the various breeds of sheep, in-

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* Read before the Cromar, Upper Dee, and Donside Agricultural Association.

ch as there are only two breeds, or the
between them, suitable for this district.
er to the blackfaced breed for our hills,
the Leicester for our arable land. Of
two breeds, there are not a few points
semblance. For instance, the formation
e head I hold to be a point of first im-
nce in either a blackfaced or a Leicester
p. A well formed head, rather long be-
he eyes, fine in the muzzle, neat in the
n of the head, the ears not too far back
rds the neck; if horned, the horns round
flat in the crown of the head; the neck
ordinary length, and wide in the chest,
in the flank, broad, long, and straight
e back, broad in the thighs, plenty of
wool, plenty of evenly laid on flesh, a
d eye, and a large strong tail. These
hat I consider a few of the chief points
good sheep. And as to the breeding of
, the same rules are alike applicable to
as to cattle in regard to fresh blood, &c.

PIGS.

lo not consider myself in the least quali-
o express an opinion in regard to these
ls, as I have had very little experience
breeding; but the little I have had,
he experience of breeders I have read,
nce me that the disappointments which
lers of cattle and sheep are subjected
breeding are not equal to those of
lers of pigs. (1.) It is rarely, if ever,
a litter of pigs partakes of the shape of
re and dam, in one and the same pig,
will not unfrequently be found that in
tter of pigs so many will resemble the
in colour and shape and so many the
le, if their shapes and colours are differ-
o that their is no real amalgamation of
parents in the progeny, the inferior
s of the one not being counteracted by
nferior points of the other. (2.) A
d difficulty insurmountable in the pig,
n every animal which usually breeds a
er of young at one birth, arises, and
s if the sow has for the first time been
a male of a different breed from her-
he will never breed pure stock again,
least stock that can be depended on as pure. I need not speculate on the reasons of this impurity of breed; it is sufficient to record the fact, and it must be obvious that breeders of pigs labour under serious disadvantages in trying to improve their breed of pigs.

I shall, in closing this part of my subject, briefly state a few good points in pigs—a fine head, with a pretty short well tapered snout, flat broad forehead, neat ears, well set on, not too long, a broad neck, reaching forward to the back of the ears, a long straight broad back, deep well-ribbed side, small bone below the knee, and fine soft birse. These I take as a few shapes of the easily fattened well-weighing pigs.

HORSES.

There is a greater difficulty in dealing successfully with this branch of the subject than with the other classes of animals I have referred to, for two reasons. (1.) Almost every person professes to be a judge of a horse; in my humble opinion, very few are. (2.) It is for either one of two purposes you want the former animal, either breeding or feeding; whereas the horse is required for a variety of purposes, and the shapes that would be his chief recommendation for one sort of work would be a disqualification for another kind of work. What do you want to breed your horses for? Farm work, or harness with a little farm work, or is it exclusively for harness? The question arises, is it for light or heavy harness, or is it for the saddle, or the saddle and harness combined, the worst horse to find or breed of any? I shall, however, confine my remarks to some general qualities in a greater or less degree applicable to the selection and breeding of three classes of horses. (1.) The horse for farm-work proper, distinguished from carting work; (2.) The horse for harness, combined with some light farm-work; (3.) Ponies, or light saddle horses. Without going into detail as to the various points, I shall mention a few leading shapes in a horse for each of the three kinds of work I have enumerated, which, with more or less modification, may qualify him for its performance.

(1.) If you want speed in a horse, select an animal that bears the nearest resemblance to the shapes of the greyhound in its formation; (2.) If you want strength for slow work, select an animal with a large amount of propelling power; (3.) If you want a horse for long endurance, at either fast or slow work, only an animal with a good constitution can stand out well.

(1.) The *farm horse* should have a comely head, but not so small as the running horse, as it enables him to throw more weight into the collars, broad and flat in the forehead, neat well set-on ears, prominent placed eyes, thin eye-lids, large nostrils, neck neat and deep towards the chest, not very high in the withers, upright shoulders, broad forearm, broad flat bone below the knee, rather short pasterns, good round feet, neither too flat nor too upright, and I should say plenty of hoof, but not hairy-legged, the back straight, the loins strong, the ribs well arched and long in the back rib, long in the quarter, but not too broad in hocks, the haunch strong, the hip well down, broad hock joint, free of bog or bone spavin, splints, or side bones. A horse with plenty of well developed muscle and a good constitution is likely to endure a good deal of fatigue.

(2.) *A harness and light farm work horse.*—The head rather smaller than that of the work horse, the neck longer and withers higher, the shoulders more slanted to enable him to put out his feet farther before him, as well as to save concussion, by running on the hard roads, chest flatter, the back, if anything longer, loins strong, long in the hind quarter, the tail well set on, strong in the haunches, broad and a little more bent at the hock joint, broad and flat below the knees, straight in forelegs, good round feet and plenty of crust, but not stripped, the legs well set under him, well ribbed, deep in flank, and not too thick in the hair, nostril large, but thin, prominent placid eyes, a large low-set gullet, and wide between the shear bones, &c.

(3.) *Pony or saddle horse.*—A small well formed head, neat, well set on sharp pointed ears, broad forehead, prominent placid eyes, thin eye-lids, large in nostrils, wide and thin in the shear bones, long tapering neck well set on, withers high, and sprung far back, shoulders well slanting, chest pretty flat rather than round, short straight back, long in the quarter, strong above the knees, before and behind, good hock joint, hip well down, thin flat bone below the knee, legs well set under, and good feet, strong above the kidneys, pretty long in the back rib, rather round than square on the top of the hind quarters. pretty long in the pastern joint, and free of curbs, corns, &c., and with all good eye sight.

In conclusion, I would, in a word, say that the breed of horses best adapted for farm work is the old Scotch breed, such as was to be found in some parts of Aberdeen, Perth, and Forfarshires some forty years ago. I do not approve of the Clydesdale breed for general farm work; they may be good for carters, if they could be got with good fore feet; but there is scarcely one of them free from side bones; besides, their hairy legs produce what is termed dry grease. No doubt they are strong, but they are ill to keep. What a farmer requires is a short-legged, short-backed barrel, easily kept, active horse, and the breed referred to, although now difficult to get, they more than any other I am aware of, combine these qualities.

For light farm work and harness, I would consider the old, strong, cob horse, as yet unequalled by any breed of horses in the world for the work indicated, the best; but as we live in the days of fast travelling, if a fourth or an-eighth part of breeding were introduced, increased speed would be attained. For hill ponies I recommend our Highland ponies—none better, but in ponies for other purposes a little breeding would be an improvement.

THE FEEDING OF CATTLE AND SHEEP.

By Mr THOMAS BONE.*

BEFORE alluding to the feeding of cattle, there is another and perhaps quite as important an element to profitable feeding to be considered, viz., the selection of the cattle to be fed. The first question here seems to be—What kind of cattle are found most profitable to feed? Or in other words, which of many breeds or cross breeds of cattle give the largest return of beef for a given quantity of food consumed? As this, however, would open up too large a field of discussion, we will confine our remarks to the kinds of cattle generally fed in Ayrshire. The shorthorns, from their quiet docile nature and flesh producing qualities, are perhaps the most in favour, and justly so, as no kind of cattle will give the same return for good keep if of fine form and quality, whether fed in boxes or tied up, if kept warm, dry, and comfortable. The cross between the shorthorn bull and Ayrshire cow is a hardier, though not quite such a heavy animal, and is most deservedly a favourite with us for feeding purposes, being more suitable for our cold climate than pure shorthorns, and found to be useful and capital feeders, often paying better than larger cattle. The pure Ayrshire breed, although not capable of feeding to so great a weight, or coming so soon to maturity, are very neat, useful cattle for the butcher, and in our local markets, especially in the spring and summer months, sell at the highest price per cwt. to those not doing a large trade in beef. The most of our Ayrshire cows when either old or otherwise unfit for the dairy, are turned in to fatten, and though not first-class beef, supply an excellent second or third-rate article, according to age and quality. The Galloway breed are also found to be useful feeders when kept till well matured and ripened for the butcher, although they are generally considered not to come so early forward for the shambles as most other breeds. The Irish crosses are very greatly improved within the last few years, which is accounted for by the introduction of the shorthorned bull, and perhaps by more attention being paid to the breeding cows also. We now find some of the best of them little inferior to our home-bred cattle; still they are always the better of being grazed for some time in this country before being tied up, otherwise we often hear of the difficulty of getting them brought on to feed and of their losing a month or two at the start. There is another breed of cattle which our attention has been drawn to of late—I mean Herefords. Owing to the severe drought in England in the summer of 1870, considerable numbers of that breed were brought into this district; but they have not taken well with the butcher, although there is little doubt that in many cases they were hurried into the market before being properly fattened; consequently they neither paid the feeder nor the butcher well.

TO FEED PROFITABLY: THE REARING OF YOUNG STOCK.

The feeding of cattle as we find it practised in various parts of the country differs widely, and each system has its own advocates; still, there is a tendency to a more liberal scale of diet than used to be given, and our fat markets everywhere give evidence that increased skill and capital are brought to bear on the production of a first-class article. There has also been much discussion lately on the most economical system of feeding. In such seasons as we have had lately, when both turnips and straw were scarce, and necessitated strict economy, many tried pulping and mixing of all their cattle food, and I have no doubt it is only where circumstances would not permit that it is not still carried on as the most profitable system. I adopted the following plan, with little variation, further than gradually increasing the quantity of food given as we find the cattle come nearly ready for the market. We give three feeds a-day of turnips sliced, with one feed of boiled meat about mid-day, and about 3 lb. oilcake, and 1½ lb. cottoncake after the evening meal of turnips, also straw or hay after each feed. The boiled meat has mixed into it as it is taken from the boiler, about 3 lb. bean-meal and 1 lb. barley-meal to each animal, the whole being stirred together and allowed to stand for three hours before being served out. The quantity given to each is regulated partly by its size, age, condition, and aptitude to fatten. Here I would strongly recommend the proper steaming of all meals before being given to cattle of any kind. I have already spoken of the proper selection of cattle for feeding purposes; but there is another point closely connected with that which I desire to allude to before leaving the subject, viz., that we feeders and breeders of stock often lose a great deal by allowing our calves, after getting milk for a considerable time, and being brought into fine condition, to be turned out to grass without giving them either milk or cake, the consequence being that they lose their calf flesh and the most of the next three months of their growth, and are very much reduced in value; indeed, no keep will afterwards make up fully for this loss. Too much care cannot be taken in the upbringing of young stock for feeding, by keeping them always in a progressive state, as they are less liable to disease than when checked in their growth. There are diversities of opinion in regard to the housing of cattle for feeding—some advocating the box system, others feeding in yards, others, again, keeping the animals tied in stalls. But, no doubt, where ample accommodation can be had, young cattle especially will grow faster and fatten quite as soon in boxes as under any other system—making more manure and of superior quality.

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* Read before the Ayrshire Farmers' Club.

MORE MUTTON REQUIRED: SELECTING LAMBS, &c.

The wants of our ever-growing population for animal food should induce farmers to turn their attention more to the production of mutton, for we find from statistics that twenty years ago there were little more, in round numbers, than 100,000 sheep annually imported into this country, while in the year just closed there were little less than 1,000,000, besides the enormous quantity of preserved mutton brought from our Australian and other colonies. Still, the demand for home-fed mutton is evident from the fact that we are now having one-half of our feeding sheep killed before they are eighteen months old; consequently, we are brought, as it were, to the very heels of the breeder. As my experience has been principally in the feeding of lambs, my remarks will be chiefly confined to that class of stock. One of the most important points to be aimed at is the proper selection of lambs for feeding. This is often one of the most difficult selections the farmer has to make, and is rendered more so by a practice generally followed in Ayrshire of the stock farmer selling all, or nearly all, his feeding lambs without any classification, such as tops, seconds, and thirds, or paleys, while in most other counties, especially in the south, they are so classified, thus enabling the farmer who wants a selected top lot for feeding off early, to get exactly what he wants. The seconds suit the grazier also, who gets an evenly, though not such a strong lot, but quite suitable for wintering on grass, then grazing the following summer, and often feeding off on turnips at the end of the season. The thirds, or paleys, find ready customers in farmers wintering only a few on dairy farms, getting the run of the whole farm, and are generally sold off in the spring to dealers, and grazed the following summer, and fed off on turnips at from twenty months to two years old.

THE BREEDS FOR WINTER-FEEDING.

The question is often asked, What kinds of lambs are most profitable to feed or winter? Much depends on the situation, soil, and climate, and the purpose for which they are intended—whether to be fed off early in the spring, or after being clipped and grazed through the summer, &c. The first class of lambs generally kept for feeding we would notice is three-parts bred, namely, those bred from Yorkshire rams and half-bred ewes. Though not yet extensively fed in this county, they are well adapted for feeding on light dry soils, with a little shelter and a good exposure, and, if receiving liberal keep, will be first ready for the fat market. They should not, however, be fed either at high altitudes or on stiff clay soils. The second class of lambs used for feeding are half-breds, namely, bred from Yorkshire rams and Cheviot ewes. They suit well for wintering on low dry lands, and, when well-bred, give a good return for any extra feeding, coming up to heavy weights of mutton, with large fleeces, also, of valuable wool, and are ready for the fat market very soon after being clipped, or at about fourteen or fifteen months old. The next class are cross-bred or grey-faced, namely, bred from Yorkshire rams and black-faced ewes, and, when strong and well-bred, are hardy, good winterers, thriving better on the majority of farms in this county than any of the finer breeds, and, when eighteen months to two years old, are considered to be the best quality of mutton in the market, although they seldom come to the same weight as bred or half-bred sheep. The Cheviot and black-faced breeds are both very hardy and particularly useful on high, poor, or undrained land, and will thrive where no other breed will do well. They are generally wintered when lambs on foggage, the ewes being kept for stock and the wethers grazed until they are fed off at three or four years old; the ewes of both classes being sold to be fattened when too old for breeding purposes.

THE MANAGEMENT OF LAMBS IN WINTER.

The feeding of the various breeds of lambs successfully requires a great deal of study and attention, as they are constantly exposed to the fluctuations and severity of our cold climate. The system I have adopted for a few years, and on which I last year wintered 170 lambs without a death, and with comcomparatively few turnips, is the following: When buying lambs for feeding, I purchase a selected or top lot, although a little higher priced, and having procured a suitable lot, we have them dipped the first favourable day after being brought home. When either driven or trucked far they are turned on to a grass field, not very rough, for a week or so, as clover or other soft diet after wanting food for some time is very apt to produce derangement of the bowels and some loss by death. They are then turned on to hay foggage, or a field of the best young pasture, and kept gradually improving until harvest is over, when they get the sown-out fields, care being always taken to have them changed often, so that the grass be kept clean. About the end of October, there is often great difficulty in getting lambs to eat either grain or turnips, especially if the pasture at the time is fresh, and should a storm come they wander about the hedges and lose condition very fast. To obviate this no trouble is too great. The best remedy I have found is to drive a few stobs into the ground, 6 or 8 yards apart, and near the communication between two fields, tying a small sheaf of oats to each stob, and placing the feeding troughs very near, putting a small quantity of fine fresh oats into them every morning and renewing the sheaves for a few days, when generally one-half of the lambs will be taking a little, and nearly all the others soon follow. Any that are still not inclined to eat out of the troughs should be got about by the feeder while the others are eating and put into a fold, each one being taken and a little of the feeding used put into their mouths, which will seldom require to be done again. We use up our refuse wheat and barley with beans, Indian corn, and locust beans, ground as fine as oatmeal and mixed in equal weight proportions; and in November, when coarse weather and frosty mornings begin, a little of the above is mixed with the oats along with a little best oil-cake. After they have taken to eat it well, the quantity is increased, and a little cut clovery hay of best quality is also given, and increased until there is about as much bulk of cut hay as grain, which prevents the more ravenous eaters among the flock from getting too much grain; it also secures that they all have hay as well, and as a proof that they learn to get very fond of the mixture they will not ea clean oats after unless almost starving. Should the lambs be wanted off early for the fat market, we begin about the end of November to give twice a-day as much as they will eat, and when a storm comes, they are more easily tided over when receiving a liberal supply in the troughs. About this time we generally remove all our sheep to the lea fields that are to be ploughed in spring, placing their feeding-troughs on the driest and, if possible, the poorest spot in the field. The feeder should be careful that no more be given than they eat out before leaving the troughs, which at this time will not exceed ½ lb. per sheep per day, and should have the troughs upset and kept always dry and clean, or considerable waste will be the result. We find the most trying time on either sheep or lambs begins in the month of January or February, when cold sterile weather or snow storms set in; or even such an unprecedentedly wet stormy time as we this winter have had, and which will be found to have reduced the condition of all classes of sheep considerably. To guard against this, we begin about this time to give turnips in the middle of the day, and increase the quantity as they are eaten out—they being at all times cut with the turnip stripper, to prevent injury to the lambs' mouths, especially when shedding their teeth. Where a flock of 150 lambs or upwards are to be fed chiefly on turnips which have been pulled and stored, I have never seen any plan of cutting turnips for sheep equal to the cart turnip-cutter made in Dumfries, which has two of Gardner's patent cylinders fitted on the axle, with a lever at the side to put the cylinders in or out of motion as may be required. With one of these carts, about 8 cwt. of turnips can be lifted from where they are stored, and carted to the field where they are to be used—beginning at one side of the field, taking clean land every day until the whole field has been gone over, and in this way any diseased turnips, as well as the sheep droppings, are more equally distributed over the land. By this machine the turnips are cut or stripped into small pieces, as before alluded to, and delivered from it in three distinct rows, so that the sheep can pass between them and pick up the pieces in a clean state off the sward if care is taken to put the machine out of gear when any dirty or soft spot may come in the way.

COST OF THE TREATMENT RECOMMENDED.

This practice, carefully followed out, will make first-class hoggs early ready for the fat market, and I think more likely to pay than if kept on poorer fare until the end of the year; and, although we have only for profit the greatly enriched state of our pasture fields for the coming crops, there is little doubt we are amply compensated, and will be likely to continue the practice. The above treatment of lambs will not cost more than 4½d. a-week up to January, but the increasing allowance until March will bring it up to about 6d. The plan of eating off turnips where they grow with lambs, and allowing a quantity of them to stand in the ground till March or April, I do not think can be made profitable. When we see a lot of lambs puddling among turnips at the breaking up of frost, or even in soft weather, with not a clean place to lie down, or, still worse, when a severe frost comes, one half of them getting their mouths entirely spoiled, I am afraid it cannot be a profitable way of consuming turnips. There may be circumtances when it is almost a necessity for the sake of putting the land into order for sowing out. Still, if the turnips were taken up and stored at the proper time—the tops being left on the ground, and the difference of the value of the early lifted and those standing on to March or April, were given in the shape of bones to the land—it would be better for corn or grass, and the sheep, getting the stored turnips, would be in better condition.

THE HEREFORD BREED OF CATTLE.

R T. DUCKHAM, editor of the "Hereford Herd Book," has the ing excellent article on his favourite in the *Field*:—

Herefords are an aboriginal race of indigenous to the soil of the county e they take their name. Yet experi- ias proved that the exercise of sound ient in making selections for breeding ses is alone requisite to ensure the suc- f those who breed them in almost every ı climate. They are of the middle horn and have for ages past been highly es- d for their fine quality of flesh, which, by termixture of fat and lean, presents that ed appearance so much prized by the e, and commands a top price in the t. The rapidity with which they lay on certainly unsurpassed, if equalled. Ex- ental trials have been made with them elected specimens of oth pure breeds, have ended in the uniform result that ield the best return to the grazier for od consumed. The value of the cattle district has been noticed by different s for many centuries past. Speed, in History of the County," says:—"The y's climate is most healthful and tem- e, and soyle so fertile for corn and cattle no place in England yieldeth more or conditioned."

e principal herds are in the hands of the t-farmers of Hereford and adjoining ies, and have been handed down gene- ı after generation from father to son in eir purity. The steers are looked upon e rent-payers of the district, and perhaps ner sight of cattle can be seen in the lom than that of the Hereford October where several thousands line the streets e antient city, and by their distinctive s and uniform appearance lay claim to other as kindred of the same family. have long been sought after by the rs of the midland and eastern counties. Amongst those of bygone days the name of Westcar, of Creslow, Bucks (one of the most active founders of the Smithfield Club), stands pre-eminent. His forty years' attendance at the Hereford fairs was commenced in 1799, and his twenty first prizes in succession at the Smithfield Show was no mean achievement. The indefatigable Hon. Sec. to the Smithfield Club, Mr B. T. Brandreth Gibbs, in his tabulated statement of the prizes awarded, has shewn that during the first fifty-two annual meetings of the Club, when all breeds met in competition with each other, 185 prizes were awarded to Hereford steers or oxen, whilst only 190 fell to the lot of all the other breeds or cross-breeds put together.

The production of steers to meet the demand of the graziers being the chief aim of the breeders, and the well-known influence of the male animal for breeding purposes, little attention has been paid to the cow. It has been thought sufficient for her to possess the qualifications which long experience has proved to be necessary to ensure success with her progeny; her milking properties have been much neglected, and the calf usually allowed to run with its dam. Owing to the almost uniform adoption of this system, she has obtained the character of being a bad milker; but in other districts, where the milking properties are cultivated, it is not so, and, as her aptitude to fatten surpasses that of most other breeds, and she consumes less food in proportion to the quantity of meat made, she is gaining favour in many of the dairy farms of Dorset, Gloucester, Somerset, Cornwall, &c.

Duncombe, in his "Farming of Herefordshire," published in 1813, says:—"Large size, an athletic form, and unusual neatness, characterize the true sort; the prevailing colour is a reddish brown, with white face." But, in 1845, when Mr Eyton issued his first volume of the "Herd Book," he found it requisite to divide them into four classes, viz., mottle-faced, light grey, dark grey, and red with white face. As each of the three first-named classes are now nearly extinct, I will briefly notice the characteristics of the latter.

The face, throat, chest, lower part of the body and legs, together with the crest or mane, and the tip of the tail, a beautifully clear white. The horns yellow or white waxy appearance, frequently darker at the end; those of the bull should spring out straightly from a broad, flat forehead; whilst those of the cow have a wave or slightly upward tendency. The countenance, pleasant, cheerful, and open, presents a placid appearance, denoting good temper and that quietude so essential to the successful grazing of all ruminating animals; yet the eye is full and lively. The head is small in comparison to the substance of the body; muzzle white, and moderately fine; cheek, thin; chest, deep and full; shoulder blades, thin, flat, and sloping towards the chine, and well covered on the outside with mellow flesh; kernel well up from the shoulder point to the throat, and so beautifully do the blades blend into the body that in a first-class, well-fed animal it is difficult to tell where they are set on; the chine and loin broad; legs straight and small, the rump forming a straight line with the back; thighs full of flesh to the hocks; a well-sprung rib and deep flank. The whole carcase well and evenly covered with rich mellow flesh, distinguishable by its yielding with pleasing elasticity to the touch, and a hide thick, yet mellow, well covered with soft glossy hair, having a tendency to curl.

The "Herd Book" was commenced [illegible] Mr T. C. Eyton, of Eyton Hall, Salop, in 1846, and the two volumes published by him contain the pedigrees of 901 bulls, but no cows. A second edition of those volumes and five other volumes have been published by the writer. The work now contains the pedigrees of 3636 bulls, 3968 cows, and 3540 heifers, and notices of the various prizes won by the animals entered; it is handsomely embellished with faithful likenesses of first-class breeding animals—the qualification for their being so placed is their having won a first prize at a show of the Royal Agricultural Society of England. To the "Herd Book" is now added, as a companion work, a "Record of Hereford Transactions," to which for the future all notice of prize animals will be confined, with the exception of those lithographed to embellish the "Herd Book." This record contains reports of sales by public auction and private contract, exportations, and other matters of interest to breeders. It is published in half-yearly parts.

Sixty years have passed since Mr Grove first introduced Herefords into Dorsetshire, and many valuable herds are now established in that county. The late Earl of St Germans gave them a place on the west banks of the Tamar some half-century or so ago, and several good herds now graze the pastures of Cornwall. They are fast supplanting the native breeds of the counties of Glamorgan, Brecon, Radnor, and Montgomery. The Earl of Lisburne was foremost in placing them on the mountain sides in Cardiganshire, and the readiness with which they became acclimatized was such that his lordship's tenantry and others gladly availed themselves of the use of the bulls at Crosswood Park with the little black cows of the district. The result was more satisfactory, and the influence of the pure bred sire is such that it is to be seen for several generations. The cross breds are equally hardy as the natives; they feed more kindly, attain greater weight, and are more prized by the butcher. The late Mr Lumsden, Auchry House, Aberdeenshire, first introduced Herefords into Scotland. Amongst his early purchases were some cows in the Hereford Fair, and a 100-guinea bull, Matchless (415), at Mr Hewer's sale in 1839. Mr Lumsden made many trials with pure-bred Herefords, shorthorns, and Aberdeens, and their various crosses, but always maintained the result was in favour of the "red with white faces." Mr Copland, Mill of Ardlethen, Aberdeen, writes:—"In regard to my experience of crossing with a pure-bred Hereford bull, I have now done so with from forty to fifty cows, for the past seven years, and have no cause to regret it; for I find that my cattle are improved in eight, that they come sooner to maturity, nd that their constitution is very much imroved. So much is this the case that a good many of my neighbours who were preudiced against the Herefords are now breeding from them." The Earl of Southesk has stablished a choice herd in Forfarshire, and am informed that "the whole herd presents kindly appearance. A demand has been reated for bulls at good prices, and those which have been sold have given great satisaction. The generally acknowledged hardiness of fine constitution and fine character s well retained and transmitted to their offspring." The late Prince Consort—that noble patron of all that was good and virtuous, whose desire for this country's greatness nduced him, amongst his other pursuits, to become a pioneer in agricultural advancement —laid the foundation of the Royal herd in Herefords at the Flemish Farm, Windsor, of 1855, and the marked success which has for several years past attended the exhibits from that herd at the various national shows is the best proof of the correctness of the judgment displayed in the selections. Mr R. W. Reynell, of Killynon, Westmeath, Ireland, whose herd was established a century or so ago, says that he has fed them with other pure breeds, and contends that the Herefords are the fastest feeders he knows, particularly on grass. Mr P. J. Kearney is equally satisfied with the doings of his herd at Clonmel; and so is Mr Gilliland at Londonderry, where t has been my pleasure to see them retaining their characteristics in all their excellence.

Thus I have shewn the satisfaction which the breeders of Herefords experience in their use from the extreme west and south of England to the north of Scotland, and from the south to the north of Ireland.

They were introduced in Jamaica by Mr Malcolm, in 1845, and in Trollope's "Travels in Jamaica" he says, "At Knockalva I looked at Hereford cattle, which I have rarely if ever seen beaten at any agricultural shows in England."

Mr F. W. Stone, of Moreton Lodge, Guelph, Canada West, has for many years been an extensive and successful breeder of shorthorns; but, in addition to these, he, ten years ago, resolved to establish a herd of Herefords, and he writes that he believes the Hereford preferable to other breeds as grazers.

There are several herds in the United States, and perhaps the most extensive are in the hands of Mr J. Merryman, Treasurer of the State of Maryland; M. G. Clarke, Springfield, Otsego County, New York; Mr W. W. Crapo, Flint, Michigan; Mr H. C. Burleigh, Fairfield, Maine; and Mr W. W. Aldrich, Elyria, Ohio.

Mr E. Maclean, Butley Manor, Auckland, New Zealand, purchased a lot of Hereford cows in Australia, and bulls from Her Majesty's herd. He writes:—"I now breed about 100 calves a-year, mostly Herefords, as I am gradually weeding out all others. I have bred Devons and shorthorns mostly, the latter for the past twenty years in this province, but I much prefer Herefords.

Many large and valuable herds are found in Australia, and numerous importations from several of the best herds in England have been made during the past few years. Hereford bulls have recently been exported to South America, and their value as a cross upon the native breeds is being tested.

RENDLE'S IMPROVED PLANT PROTECTORS.

GROUND VINERIES, LAWN CONSERVATORIES, ORCHARD HOUSES, GLASS WALLS, GLASS COPINGS.

THE attention of our readers was some time ago directed (vol. v., page 53), to Mr Rendle's simple and useful aids to culture, then but recently introduced. At that period only a few forms were offered to the public (circular protectors for Cauliflower, or specimen plants, ground vineries, Lettuce, Pea protectors, &c.); the chief difference in all but the circular ones, consisting almost wholly in the height of their sides, and width of their glass roofs. Now, as the above heading will shew, new and much larger fields of usefulness have been entered into; and there is hardly any sphere of practical gardening in which we do not meet with Mr Rendle tendering us his assistance. I have not yet had the opportunity of testing practically his more recent inventions.

But Mr Rendle is entitled to that confidence that we repose in guides who have led us safely through dangers in the past. We naturally trust such for the future. And, certainly, the first protectors were not found wanting upon trial. In practice, most of them not only did as much, but more than the inventor claimed for them. I have found them by far the most efficient small portable protectors I have tried. While plants were frozen dead under cloche and handlight, they lived under the warmer sides of these protectors.

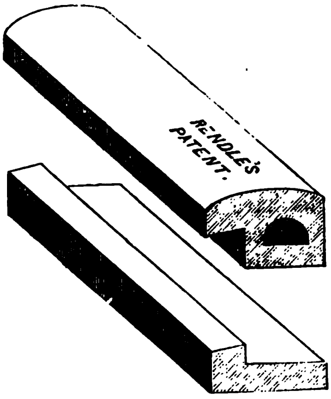


Fig. 1.—Improved Brick for Lean-to Protectors.

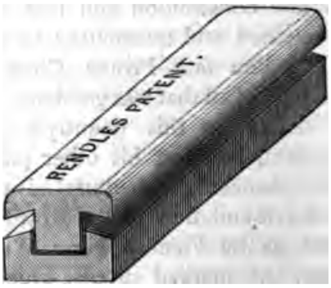


Fig. 2.—Improved Brick for Span-roofed Protectors.

Opaque sides are warmer than transparent, for several reasons. There is no loss of heat by radiation, and that loss is slow by conduction. The difference in cooling between handlight or cloche, and one of Rendle's protectors by conduction, is as the difference of thickness between a sheet of glass, say 16 oz. to the foot, and a common brick laid on the flat. The substance of the brick not only resists the escape of heat from within, and the entrance of cold from without, but it likewise becomes a reservoir of heat in itself. All day long the sun is filling the brick more or less full of caloric. When night draws its cold, it may be icy, curtain around our plants, this stored-up heat is liberated to enable them to resist its force. And in this way they are saved. With the thinnest veil thrown over their cold glass faces, which, uncovered, become heat stealers with a vengeance, at night running away with it through the three open doorways of connexion, radiation, and conduction, they are made virtually frost-proof. It takes a great deal of frost to get through a thick hollow tile, or a dry 4½-inch brick; and a thin littering of straw on the surface of the glass closes all the doors against the escape of heat. This is no longer an affair of theory. Several seasons' practice attest that glass protectors, with brick or tile sides, retain an ount of heat, and keep out a degree of ld that would seem impossible to those o have not used them.

In proof of the efficacy of these protec- s, I may state that Lettuces and En- re passed through last winter, by no means nild one, unscathed. And that protectors, t open at each end to save the trouble of ther ventilation, accelerated the ripening Strawberries in the open air six weeks. is is one of the most useful purposes to ich they can be applied. There is often iatus between the last forced Strawberries l those ripened in the open air. By cover- a row or two with these protectors, all ger of a break in the supply is obviated. ink I adverted to the peculiar adaptation Strawberry cultivation in my first notice. t I have found them even more useful than ad anticipated.

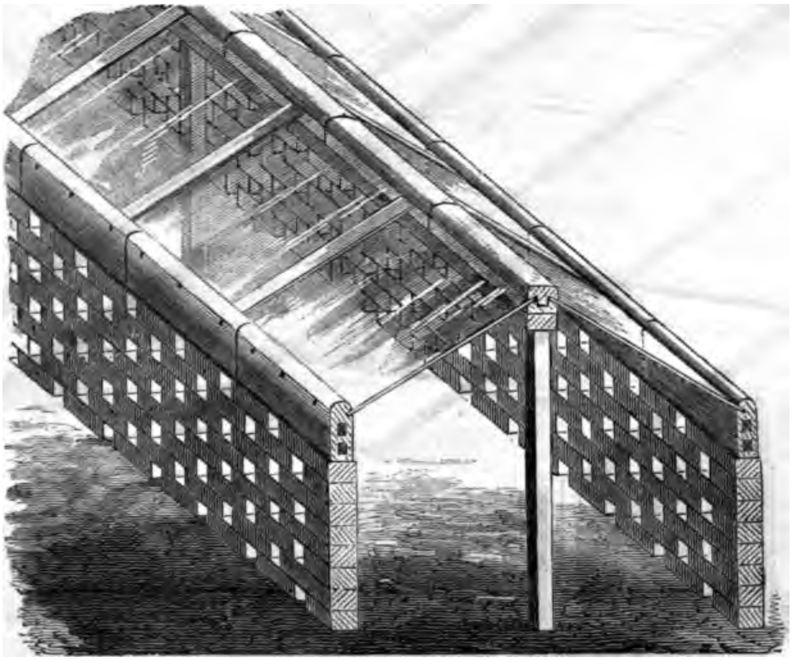


Fig. 3.—Span-Roofed Protector fitted for use in Summer.

ut my object in writing at the present e was not to testify to the merits of the old tectors—that is well established—but describe the new. One more word, ever, before dismissing the original forms. None of them are superseded by the new. It would be difficult to devise anything better for the purposes for which they were intended. More are being used every day. All the new forms are extensions and additions, so that there is no occasion to have done with the old loves before taking on with the new. True, a structural improvement has been effected, which is applicable to all the Protectors. But this simply facilitates the working of them, and has no bearing on their cultural value. It will be remembered that the glass slipped into a grooved brick, at back and front, and was thus held in position. Some found a difficulty in getting out the glass for watering, fruit gathering, &c. I never did. I simply pulled a brick backward or forward as the case might be, seizing the end of the square with the other hand as I did so.

All this, however, is now simplified. The grooved brick at the back is made in two parts. The bottom portion receives the glass as before, and the top is then laid on, keeping the glass in position by its weight, and pitching the water over it by its projecting edge. Figs. 1 and 2 shew the form of this covering brick for the lean-to and span roofed protectors. The term span-roofed, brings us at once to some of the new forms. These double the area enclosed; and, by raising the side walls, any desired height, from 1 foot to 6 feet or more from the ground, may be provided. Fig. 3 shews one of these fitted up for summer use, for plant growing, the white spaces shewing the distance of the bricks from each other, thus ensuring the most thorough ventilation. In fact, there is a danger, even in summer, of over-doing the ventilation, thus subjecting the plants to a lower temperature than they would be exposed to in the open air. This pattern would grow most plants better were one wall built close. Mr Rendle's ground vinery at Sawbridgeworth is built pigeon-hole fashion, and hence it hardly ripened the Grapes this season. In very hot seasons, such as those of 1869-70, the open mode was probably the best; though even in the latter I closed the sides of a ground vinery, and ripened Muscat Grapes that were planted by mistake for Sweetwater. These open spaces are left large, or small, or totally closed at the option of every one, and are no part whatever of the invention. Fig. 4 shews how a large area can be covered in front of a greenhouse and stove, and heated through small openings in the wall. In this case, and others of like kind, a wooden platform is used, and the glass is held in position by the employment of grooved bars of galvanized iron, resting on this wooden base. By similar means, the surface of walls is covered from the frosts of spring, or the fruits helped to ripen in sunless autumns more rapidly. Fig. 5 is probably one of the most useful, as likewise the latest of Mr Rendle's inventions. A glass coping

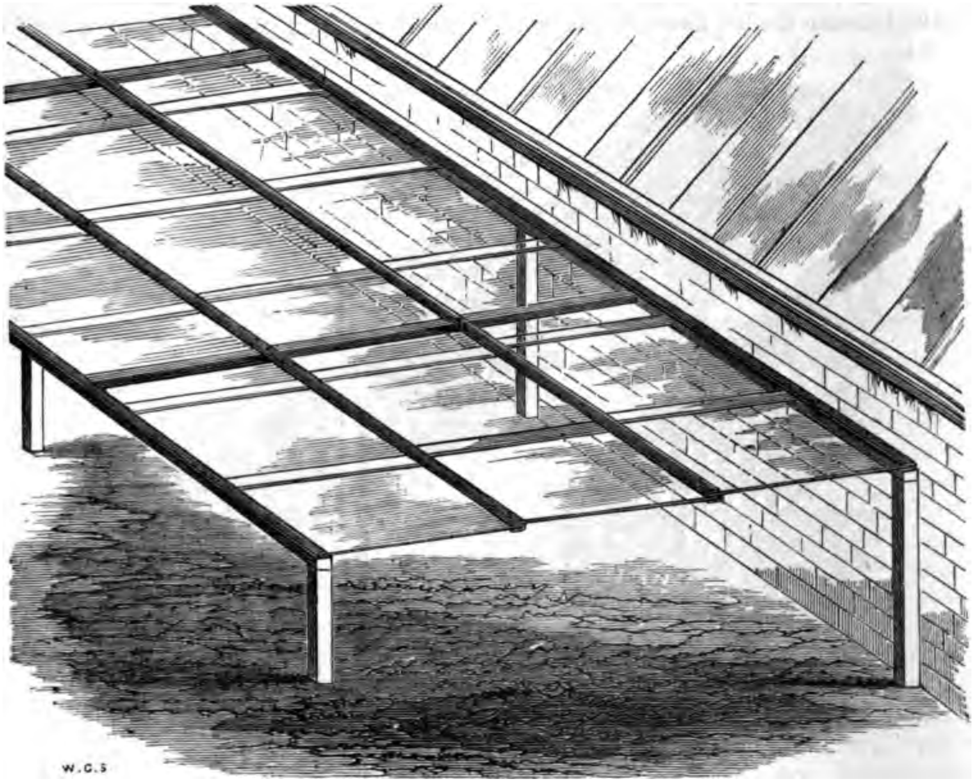


Fig. 4.—A Protector in front of Greenhouse, shewing mode of supporting the Glass.

2 to 6 or 8 feet wide for wall trees, and ttile wind-and-frost-breaker dangling from ont, is likely to solve one of the most ish problems in horticulture, by affording ection from cold without weakening the by the shade of the protector.

f this the inventor says :—

This new invention is for the first time duced. On looking at the engraving it e seen that the glass is fixed on the top e wall. A piece of wood is nailed to the work, with the Patent Metal Groove; another piece of wood, about 2 feet the wall, is supported by uprights with etal Groove also. The glass runs in metal grooves, as in the earthenware ctors, and as the glass falls into the r groove, it will stand the most severe gale of wind." This will be found to be the most valuable idea that has sprung from the new Protector system, and every wall in the kingdom should be protected in this way.

I think, however, your readers will hardly be able to contain and restrain themselves as I submit the next two forms of these Protectors—the Lawn Conservatory and Cordon Case, figs. 6 and 7, both the invention of the great fruit grower, Monsieur Brehaut. They are just the things that all villa gardeners have so long wanted. Cheap contrivances where plants may be grown for the window, and stored in safety for the winter, and fruits may be ripened six weeks or two months before the same varieties on the wall, or in the open air. They differ from all the other types adverted

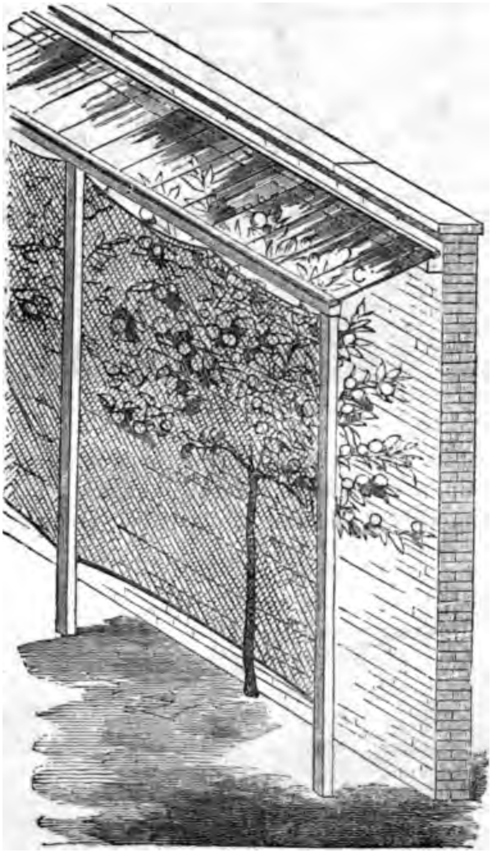


Fig. 5.—Protectors for Wall Trees.

to mainly in this: that while the door of admission to most of these is through the roof, and that roof must be removed to get to the plants or their produce, in these the back wall folds down throughout its whole length, and enables any one to train, water, remove, gather anything from within, without disturbing the roof at all. The back is formed of wooden shutters, in handy lengths of 3 or 4 feet, and the whole structure is supported on a platform of wood. Fig. 6 can be placed anywhere, even in front of a drawing-room window, and cannot fail to become an endless source of interest and amusement to any lady or gentleman who are their own gardeners, as also of great use to the professional gardener. There is hardly any tribe of plants that could not be grown in these cases. The inventor, M Brehaut, writes of heating the larger ones to force Roses, and grow early Strawberries for market. Fig. 7 may be placed over any cordon tree, Grape

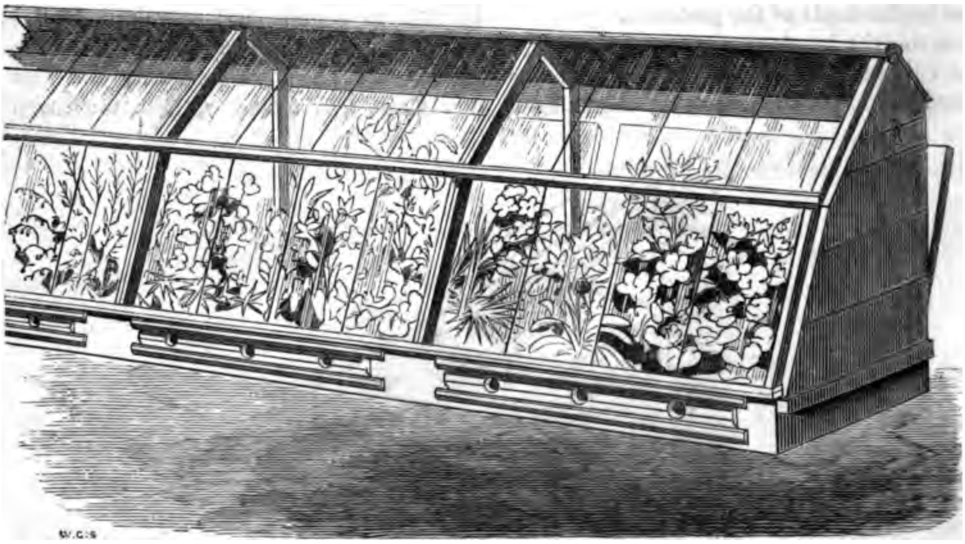


Fig. 6.—Rendle's Lawn Conservatory.

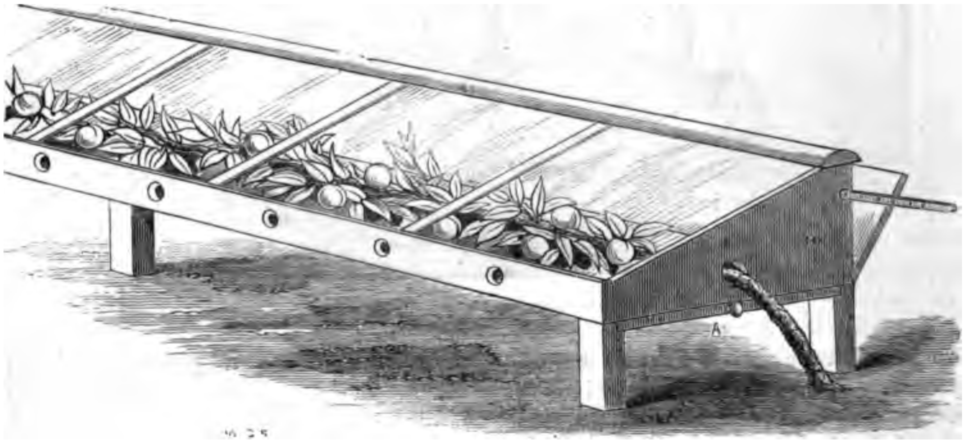
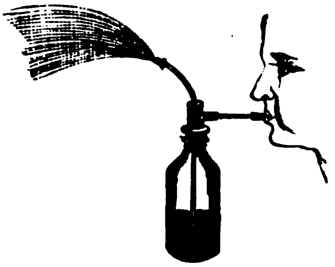


Fig. 7.—Rendle's Protector for Cordon Trees,

or fine Rose shoots, such as Celine er, Gloire de Dijon, Marechal Niel, ed to force the flowers or fruit in r, and protect them in winter. The or recommends a moveable platform this case, to be lifted up and let down weather is fine or foul, hot or cold. former, let it down, and the hot air eep in under the trees. If the latter, p till it reaches the enclosed sides, and se will be kept close and warm. I dispense with this entirely, and fill in nt space from the ground upwards, de- g for ample ventilation on the folding shutters at the back. Neither should the tree lie on any platform, moveable or otherwise, but be suspended on a wire from 4 inches to 1 foot from the ground. The earth will then form a more genial nourishing base line than any other for the fruit, and the case without the platform will cost less to purchase, and prove more useful.

Such are a few of Mr Rendle's more recent improvements. He offers many more, but these may suffice to tempt many of your readers to a closer acquaintanceship with some, if not all, of these handy helps to horticulturists and gardeners.

HORTICULTURAL VAPORIZERS.



Horticultural Vaporizer.

E accompanying woodcut, which we copy from the *Gardener's Chronicle*, re- ts an ingenious contrivance which will nd extremely useful for the application id insecticides. It is called the Hor- ral Vaporizer, and is, in fact, a modifi- of the vaporizer used at the toilet for persion of scented liquids, but adapted by these modifications for horticultural use. By means of this apparatus, any kind of liquid may be diffused over plants in a state of minute division, or fine spray, in sufficient quantity to thoroughly moisten them, without ruffling or disturbing the most delicate flower or foliage; and at the same time with a great saving of the liquid as compared with the ordinary process of syringing. It is said that a table-spoonful applied by the vaporizer is equal to a pint applied by means of a sponge, or the ordinary methods in use. The vaporizer may be used either by blowing, or by the use of a pair of bellows, fastened by means of a small piece of india-rubber tube to the mouth-piece. As a disinfectant distributor for sick-rooms, it is also useful. Messrs Parr & Atherton, of Nottingham, are the inventors.

LAWN MOWERS.

THE very name of lawn mower almost frightens the Paterfamilias of a villa garden, who has so many demands upon his purse. He cannot see his way to spend as much upon an article of that kind as he has done quite recently upon a sewing machine. The matter of £5 sterling, now-a-days, does not go very far in shopping of any kind; and when he begins to count the cost of everything in the extraneous way, outside of direct personal comfort, he buttons up his breeches pocket, and, with the determined air of imperturbability, resolves to disburse only for what is absolutely necessary, and what will, in a measure, shew something like value. He will rather yet bear the noise of the risp, risp of the whetting-stone upon the scythe, and pay his monthly jobbing gardener's bill, than "go in" for an article of so extravagant a kind as the usual high-priced lawn mowers. Moreover, his lawn is not so very large as to require an expensive implement of that kind; and supposing it were, the question with him as a business man would be, Is it cheaper and better than what I have been accustomed to? That is really the main point. Thousands of villa owners do not care so much about their lawns getting a little bit out of order. If they get them mown once a-month, or probably once in six weeks, that is all they desire. It may cost them "from 5s. to 7s. 6d." to get the garden brushed up, and that, multiplied by four, is something like the summer expenditure for mere "order" work.

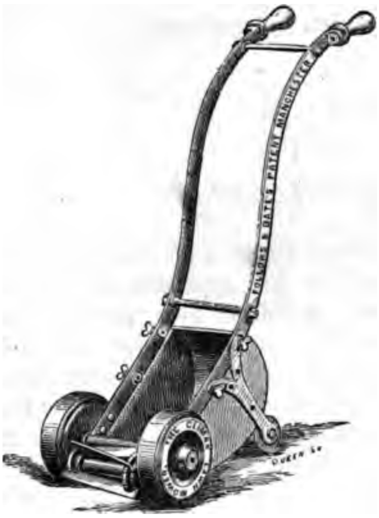


Fig. 1.—Climax Lawn Mower.

But supposing we were to shew to that class of our readers how to keep their lawns in an inexceptionable state at even less money than the sum above named, what then? We shall have all attentive eyes now in scanning every particular. This much we would in turn stipulate for, that some of the household of Paterfamilias would not object to do a little exercise once a-fortnight. It will not soil the fingers nor weary the frame—it is, in fact, pleasant work pushing along the "Climax" Lawn Mower! "But what about the cost?" It is within the reach of the dweller of every villa and every cottage orné. It is only 25s., and it will mow quicker and better than the best scythe in the hands of the best gardener that ever handled scythe. "Only 25s., and capable of being managed by a servant!" Yes, or by a boy or girl of the household. Certainly a clever little implement, and it is finding its way into tens of thousands of the houses of England, as we are given to understand. It is, without doubt, a requisite of the first importance from an economical and also from an "order" point of view. Instead of the garden costing 30s. for summer dressing, it need not cost above one-third of that sum with the "Climax" in the hands of a member of the household. What is most advantageous in its manufacture is its simplicity of parts, and the non-liability to get out of order. This is a point which must always be considered before one commits himself to buy, when he knows that the article will be handled and knocked about by dirferent individuals. A little oiling to keep what little rotatory machinery there is in working order, is all the care that is needed. In order that our readers may the better understand the nature of the implement we write about, it may be well to present an illustration of it, which we are enabled to do through the courtesy of the patentees, Messrs Follows & Bate. Fig. 1 represents the 25s. article, with all its fittings. Fig. 2 represents the same implement at work without the box, among long grass on a steep bank.

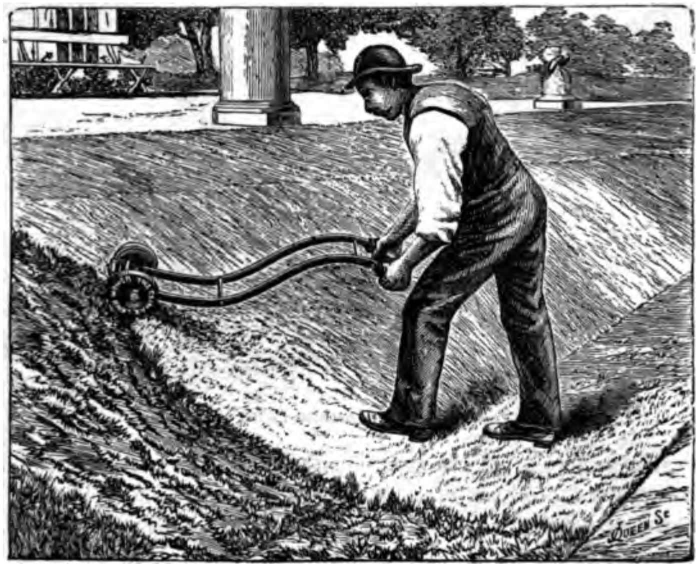


Fig. 2—"The Climax," as used on Steep Banks or Slopes, without Box.

The makers thus describe its mechanical features:—

"The two novel features in its construction, and in which it differs from all other machines of the kind, are (firstly) the entire absence of the heavy iron roller behind the knife, and the substitution of the grass collecting box in its place, so that every impediment being removed from the front, the machine can be worked close up to walls and trees, or underneath shrubs, without removing the collecting box—the grass being cut as it grows, and disposed of with almost equal rapidity, whether wet or dry; (secondly) in the revolving cutter being propelled by a simple wheel and pinion—which gear direct instead of being connected by intermediate wheels or chains."

ANGLO-AMERICAN LAWN MOWER.

HE same makers have a set of what they call Anglo-American Lawn Mowers, ch are worthy of notice. They are manufac- d upon the same principle, are stronger, from their construction and ease of ght, a man can work what it requires a to do with the machines of many other ers. They are equally efficient for mow- ns, whether they be level or undulating, terraces and slopes, whether the grass be long, or whether it be of the usual lawn length—no matter, the Anglo-American does its work perfectly. Fig. 1 shews it in its complete state for mowing and collecting at the same time. Fig. 2 shews it in condition for mowing long or wet grass, when the box would be an encumbrance, or rather the emptying of it would involve so many stop-

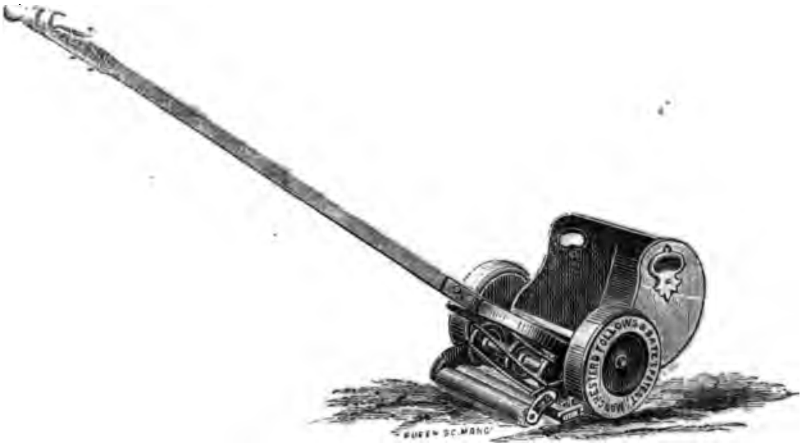


Fig. 1.—Anglo-American Lawn Mower.

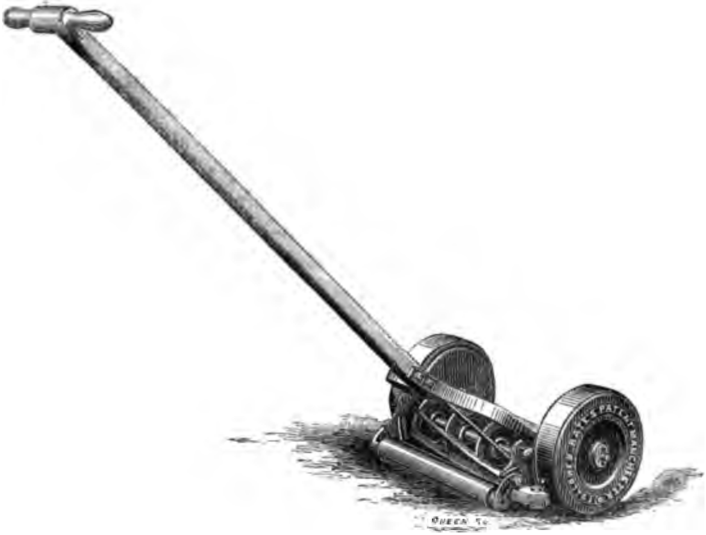


Fig. 2.—Anglo-American Lawn Mower, cutting long Grass without the Box.

pages as would interfere with the time of the man employed. By a clever and ingenious contrivance, the handle can be turned over, which raises the cylinder off the ground, as s illustrated by fig. 3, shewing the facility with which it may be transported over rough roads if necessary. These machines are, of course, much more costly than the "Climax," but they are generally made to cut from 12 to 48 inches. They are more suitable for such places as have considerable breadths of lawn to dress; and from their general simplicity, coupled with the substantial details of which they are made up, offer a sufficient guarantee to buyers that when they invest, the investment is value for value. Without depreciating the implements of other makers, which have so long been before the public and given much satisfaction, we hail the Anglo-American as a novelty that merits our approval from the dissimilarity of its construction to other implements of similar aim, and the successful application of it as a lawn mower.

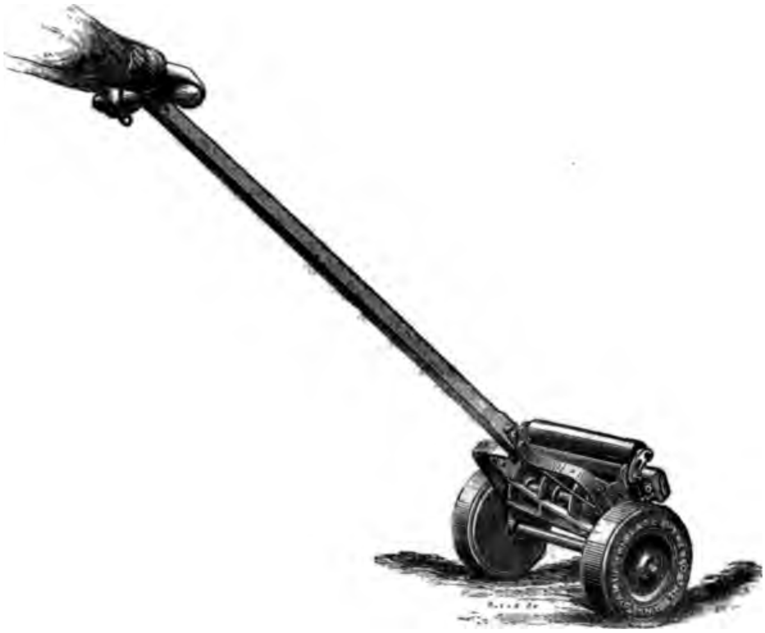


Fig. 3.—Anglo-American Lawn Mower on the Road.

Work in the Garden during March.

From "The Villa Gardener."

THE VINERY.

THIS is one of the most uncertain months in the whole year. Now the sun bursts through with midsummer-like splendour and heat, and anon, winter—hard, stern, severe—binds all Nature and all life hard and fast in the iron fetters of frost. Of course, within the vinery we can laugh at these extreme—we had almost written wanton—vagaries of March weather. Still, we cannot altogether escape from the range of their influence, and the horticulturist must be wide-awake during this month if he is to reap bountifully by-and-by. March sunshine, from its sheer suddenness, tends to wither tender shoots as much, or more, than it strengthens or nourishes them. These sudden gleams of light and heat also compel us to let the external atmosphere into the vinery. It enters harsh, hard, and dry, and, if due care is not exercised, it will drain the bursting Vine-buds, or young juicy shoots—dry of their nourishing sap. To the March air no thoroughfare must be allowed. If admitted, as it must be, it must return by the same door that it entered. This baulks the dry air of much of the moisture that it meant to steal, fetters its speed, and reduces its power of mischief to a minimum. Therefore, during March, lay it down as a Mede and Persian law—never to be reversed—not to open the front and back, or top and bottom ventilators of the vinery at the same time. During the entire month we must also watch the clouds, as a cat watches a mouse. A black cloud passing over the sun's disc in March makes all the difference between summer and winter. Before the cloud, and as soon as it has passed, the sun shines with summer-like power and splendour. No sooner is it hidden than winter reigns. With equal promptitude must the vinery be opened or shut up. Half an hour's ventilation in a keen wind, with the sun under a cloud, may wreck and cripple the crop of Grapes. Hence the need of the most careful ventilation during March. March air is mostly dry, therefore damp the floor of the vinery several times a-day, by sprinkling the entire surface over with a fine rose watering pot, and syringe the Vines overhead at least twice a-day—say at eight in the morning and four in the afternoon.

Maintain a genial temperature of from 50 to 55 deg.; gradually disbud the Vines after the shoots have grown 2 inches or so. This enables the cultivator to choose the best, and these early growths take but little out of the Vines, and are probably useful in summoning the roots to be up and about their proper business—that of forwarding abundant supplies for the tops.

THE ORCHARD HOUSE.

From 45 to 50 deg. will be heat enough here. Stone fruits are impatient of heat when in flower, and still more so if in a close, moist atmosphere. Therefore, give air freely at every available opportunity. Take advantage of mild days and gleams of sunshine, to change the whole atmosphere of the orchard house. Through draughts are, perhaps, hardly so dangerous here as in the vinery, nevertheless, they should be avoided. It is much safer only to open one set of ventilators at one time, and alternate them at different periods of the day, than to open both to a lesser degree simultaneously. The flowers of Peaches, Nectarines, &c., are delicate, and easily drained dry; and the ovary, with its delicate pistil, on which the crop depends, is still more susceptible of injury from draughts and currents of cold air, and ought not to be exposed to such risks, as such often are, by reckless, thoughtless, ventilation.

Of course, in cool—that is, unheated orchard houses, more air must be given, and a thorough draught kept up, to retard the blooming season. There is little danger of any ordinary cold injuring stone fruits until the flowers are open. From that moment and until they are fairly set, the danger period extends, and extra care is necessary.

If no bees make their appearance, tap the trees gently half-a-dozen times a-day to disperse the pollen. Or, better and surer still, get a very soft camel-hair pencil and smother it with pollen among the stamens, and lightly touch each pistil. This artificial setting of the fruit cannot be done too lightly. For it is a singular fact that although even the great humble bee and the common honey bee appear to fumble and tumble about anywhere, without injuring the vital, that is, the fruit-forming organs of the flowers, yet our touches with brushes, &c., are very apt to do so. Keep the air pretty dry during the period of setting. Or rather, perhaps, see if possible that the flowers become dry for an hour or two each day, so that the pollen may disperse in showers of golden dust when touched. If this condition is ensured, morning and evening syringings will do no harm, even when the trees are in flower. Of course, all sprinkling would be dispensed with during dull weather. Keep a sharp eye on ants and aphides. They often work sad havoc on orchard-house trees in blossom. The ants eat out the hearts of the flowers, and help the aphides to ıe plants dry of their richest sap. No quarter given to either. Neither do I like fumigating uits in full flower. They ought to be examined hey reach that stage, and every aphides washed lled dead with smoke by Gishurst's Compound, mixture. The ants should be enticed into e-posset, seasoned with arsenic; or they must ed to their lairs, and destroyed with boiling No quarter must be given to the ants, for, as ly been shewn by Mr Newman in the *Garden*, nply milk the aphides that they may drink more ıd establish new colonies in fresh pastures, ong our greenest leaves, just as we might look ıer fields for our own cows, when the milk ıed to run short.

r the roots of the trees thoroughly should they and beware of hungry chaffinches and tomtits in to feast on your fruit buds.

THE GLASS HOUSE.

h is mostly a month of beauty and of trial for ss house. Glorious Camellias and charming ; come in, and the former are apt sometimes to ff with a rush. The sun is so fierce, and the ry, that the flowers have often a trying time of r is freely given to keep down the temperature, as! the flowers are also sent down along with ıt. Cinerarias, Chinese Primulas, double and and even Heaths and other hard wooded feel the vicissitude of March weather, and often ınd hang their heads in consequence. Little ; done if their symptoms are understood. But re amateur villa gardeners innumerable, who ner see a Camellia blossom prematurely fall, Ieath or Primrose droop, than they rush at ı the watering-pot, and soak it through. In ay, thousand of plants are killed, that, only slightly, would have lived under the fierce of a March sun. This flagging in the early is no proof of dryness at the roots, but of an excess of water in the stems, origi- in the dullness and darkness of winter weather. medy is shade—not more water, and but little comes of it if we give the plants time to recover, nply let them alone. However, as a rule, plants eed more water in March than in February. ıratively few plants, however, need so much their flowering as their growing period. This is especially applicable to hard wooded plants. ooded ones, such as Pelargoniums, Fuchsias, row and flower simultaneously. But Camellias a great extent, Azaleas, flower first, then grow, mature their buds for next year, and flower

Many Camellias cast their buds through ıg them during the flowering stage as copi- as during the succeeding or growing one. and train Fuchsias, Pelargoniums, Petunias, other plants that require it. Clean and train Climbers. Put in and pot off cuttings, if these are stored and propagated in the glass house. Sow seeds, and keep everything scrupulously clean.

PITS AND FRAMES.

Cucumbers and Melons.—Sow, pot off singly, and plant out. Keep up a temperature of 75 to 80 deg. bottom, and 70 deg. surface heat. It is a good plan to stop Cucumbers at every leaf in front of the fruit. This keeps the plants at home, and ensures a succession of fruit. Plants so treated will likewise go through the season without exhaustion, a great point for the villa gardener; whereas, if allowed to grow more freely, a glut of fruit comes all at once, and there probably will be an end of the plants. Melons should be stopped when they have made two rough leaves; then two, three, or four shoots taken from each plant to within a few inches of the side of the pit or frames, and these stopped again. These branches will then break and throw out laterals along their entire length, and on these latter, the male and female blossoms shew. From four to six should be set on each plant on the same day. Two of the best and surest croppers are the Queen Emma, green flesh, and the Merton Hall, scarlet flesh.

Rhubarb, *Seakale*, *Asparagus*, &c.—should still be introduced into a temperature of 60 deg. every three weeks, or so, if a succession is to be kept up. Also place *Dahlia*, *Salvia*, *Marvel of Peru*, and old *Pelargonium* roots in the same temperature, to stimulate growth for cuttings.

Strike and pot off cuttings of Verbenas, Ageratums, Petunias, Iresines, &c. Sow and prick off seeds of all tender and sub-tropical plants for the flower garden. See that the seed pots are clean and well drained, and that the soil used for seed sowing is free from weeds, and light, sandy, and suitable for this purpose. Use soil moderately moist, and give no water for a week or so after sowing—nor at all, till the seeds come up, unless the soil gets too dry, which it is not likely to do in a hot pit at this season of the year. If water becomes necessary, use a fine-rosed watering pot, so that the seed is not washed out.

Cold Pits and Frames.—Remove cuttings or plants from the glass house and hot pits to these, as soon as they get well established.

Sow *Half Hardy Annuals*, such as Stocks, Asters, Marigolds, Zinnias, &c.

Re-pot late Cinerarias and Calceolarias.

Pick over and top-dress Auriculas, Carnations, Heartsease, &c. Pot seedlings of Hollyhocks, and push them forward so as to flower strong in the autumn. Sow another pot or pan, or part of a frame of Radishes. Plant early Potatoes, &c.

Protect from frost, and give as much air as possible consistent with the hardiness and well-being of the different occupants of those most useful of all things in gardens, pits, and frames.

THE FRUIT GARDEN.

The protection of the blossoms of fruit trees is one of the most important works of the month. The modes of doing so are almost endlessly varied. All ought to aim at the same general purpose, the keeping off the frost without making the trees tender. Temporary projecting copings of wood, from 1 to 2 feet wide, are perhaps as good protectors as any. Mr Rendle also offers glass copings of any desired width. These admit the light, while resisting a good amount of cold. But, of course, glass cannot keep out the cold equal to wood. Again, canvas or bunting of all sorts are used on rollers, &c., to make it portable. These opaque protectors are also fixed. The latter is a dangerous mode of protection, and mostly results in failure. The trees are weakened for want of light, and the fruit that escaped the teeth of the frost often fall victims to the absence of the direct light and heat of the sun. We dare say, that we are getting old-fashioned in this matter, but we confess to a considerable affection for Spruce branches thinly nailed over the trees. The heat of the spring gradually defoliates these, and the frost is kept off with less enfeeblement than is caused by almost any other sort of protection. In unfavourable localities, the best, and in the end the cheapest of all modes of protecting choice tender fruits on walls, is a facing of glass.

See to the staking and mulching of all recently planted trees, and should March dust abound, let it remind you of the need of water for such.

Grafting.—This is the best month for the performance of this most interesting operation. If any of your Apples or Pears have not come up to your expectations, off with their heads, or cut off their branches, and put on superior varieties. Better far have half a dozen trees of one superb good-keeping Apple than fifty inferior varieties. Selection, not collection, is, after all, the secret for providing a good dessert all the year round.

Mulch, if not already done, the plantations of Gooseberries, Currants, Raspberries, Strawberries, with rich manure, and saturate them with house sewage, if you would gather prize fruit by-and-by.

Dust the buds of Gooseberries, Plums, Cherries, Apples, Pears, on dewy mornings or showery weather with dry soot, or quicklime, or guano, to nauseate them, and thus render them bird proof. The havoc the birds make no one would credit who had no experience. They picked the buds from an espalier of Apples for us in about two days last March. They had never touched it before, therefore it was not doctored, and I lost the crop. Forewarned, forearmed; therefore up and pickle the buds you want to keep, at once.

Fruit Stores.—How tantalizing to many this seems; Still, if there are a few left, do not forget to pick them over once or twice a-week. Apples have kept admirably this season.

THE KITCHEN GARDEN.

This is the seeding month—the gardener's wheat-sowing. Therefore, presuming the soil has been mellowed into fineness by the winter, and that the surface is dry, hasten to sow at once such crops as Onions, Parsnips, Peas, Beans, Early Carrots, Cabbages, Cauliflowers, Leeks, Brussels Sprouts, Lettuces, Savoys, Spinach, Radishes.

Plant Early Potatoes, Rhubarb, Seakale, Horseradish, and herbs of all kinds. Also Cabbages, Cauliflowers, Lettuces, from under handlights and protectors. Make up blanks among those wintered against walls. Stir the soil among these crops and Early Radishes, &c.

Sow Celery in heat, or under a protector for a first crop; also Tomatoes, Chilies, Capsicums, Vegetable Marrows, or Ridge Cucumbers. Remove all old Cabbage-stalks as they get cleared of sprouts, and Brocoli stems as they are cut.

Hoe among growing crops of winter Cabbages, Spinach, Lettuces, &c.

Earth-up and stake early Peas as a means of protection, as well as a source of nourishment. See that the birds do not dock the tender shoots. Blacken them with soot as a preventive measure, and a stimulus to growth as well.

Remove every frost-bitten vegetable before it has time to pollute the air with its vile odour, and see that no quarter is given to weeds. These often have the cream of the earth, and leave, as it were, but the sky blue milk of an exhausted tilth for our plants to feed upon. Every weed ought to be barred out of our gardens with as much jealousy as we should keep burglars out of our homes. But, on the contrary, many cultivators allow the weeds even to become seedy with the fullness of their stolen wealth, before they turn the arrant thieves out of the garden. This is locking the stable after the steed is stolen with a vengeance.

The Veterinarian.

UNERVING HORSES.

PON this important subject, the "Special Commissioner" of the *Sportsman* ; the following remarks :—

the information of breeders who may have or stallions afflicted with inflammatory disorders feet—such, for instance, as that under which old Newminster succumbed after suffering :ly—a veterinary friend of mine in extensive :e has written to me suggesting that a trial be given to a plan for alleviating pain which tried with success. Paradigm, the dam of Lord and Achievement, is a martyr to navicular :, and the greater part of her time is now spent cumbent position. The last time I saw Achieve- when she had a foal at her heel, she was tly suffering from an inflammatory state of her which will probably culminate in the same dis- for which there is no positive cure. I am also nted with very many racing sires and brood so afflicted, but as they are the property of who have to sell their yearlings, it would not for me to give their description, this being one se disorders which are in many instances trans- , and are always considered to be of an :ary character. The intense pain suffered by rood mares will cause permanent sterility, and lways impair the health of stallions by pre- ; them from taking a sufficient quantity of e. The remedy suggested by my friend is the ion known in veterinary science as "unnerving," is the division of the nerve below the fetlock- ı order to destroy the sensibility. I will, how- state a case from his own words. He says :— first subject suffered very much from navicular ; she walked with extreme difficulty, and was lying down to ease her feet when in the stable. ad failed to breed a foal three years in succes- Finding no trace of disease about the animal, in her feet, on which she could scarcely stand ıe severity of the pain consequent on navicular in its worst form, and that she was reduced to a skeleton from the same cause, I recom- d her being unnerved beneath the fetlocks of ore-legs. The operation was performed, and mmediate relief. From that day her health to improve, and she rapidly got into good con- In the following season she was covered by the horses to which she had previously missed, oved in foal to the first service. The produce was a colt, and she had another foal in the following season, proving an excellent nurse, and keeps up her condition." In conclusion, I may state this is an operation frequently resorted to by "copers" to disguise lameness from navicular disease, but the horses so operated upon are ever after dangerous to ride or drive. For brood stock, however, I think the proposed remedy is founded on common sense, and as any qualified veterinary surgeon can perform the operation without danger, I can confidently recommend its adoption in cases where animals are all but worthless from the causes I have named.

The veterinary surgeon whose statement the "Special Commissioner" adopts, does not mention that notwithstanding the division and abscission of the nervous structure in the fetlocks of animals suffering from lameness, sensitiveness, in the course of a year or two, again returns, and with this also all the symptoms of navicular disease. This fact was mentioned at the last meeting of the Central Veterinary Medical Society when the subject was under discussion. It was admitted by the speakers that the operation of unnerving resulted in a freedom from suffering; and Mr F. J. Mavor, one of the vice-presidents of the Society, who introduced the subject, produced two specimens of nervous structure which had been divided, shewing perfect reproduction—one, the nerve restored, and the second a prepared section for examination under the microscope, in which the true nerve structure could be distinctly recognized in the new formed material. He mentioned that in consequence of the re-occurrence of the disease in this manner in an animal which he had treated, they had been compelled to destroy it. It was contended by other members that the operation of unnerving, could be again carried out satisfactorily on the reproduction of the nervous substance. After a long discussion, the meeting came to the decision, that, nowithstanding previous teachings to the contrary, the nervous substance is frequently reproduced; and when portions of a nervous trunk have been removed to deprive a diseased part of acute sensation and lameness, both are eventually likely to recur from that reproduction, at periods varying from two to several years. The knowledge of this fact, we hope, will enable breeders to exercise caution in breeding from animals affected with the disease.

THE CHARLIER SYSTEM OF HORSE-SHOEING.

A LECTURE on the Charlier system of horse-shoeing was lately delivered in the Town Hall, Hamilton, by Mr Andrew Gillon, of Wallhouse, Chairman of the Veterinary Committee of the Highland and Agricultural Society. The following extracts from Mr Gillon's address are taken from the *Glasgow Daily Mail*:—

Some six or seven years ago an innovation on the old system of horse-shoeing was made in Paris by M. Pierre Charlier, V.S. This gentleman invented the new system, which is now fully appreciated on the Continent. The principle carried out is never to touch the frog, nor bars, nor the the sole of the foot, only the lower edge of the crust is cut away and replaced by an artificial border, more resisting than horn, but of the same form, thickness and length, flexibility and elasticity. In this system the horse is not shod in the ordinary sense of the word, but a ferrule or ring is placed round the natural foot in the same manner as a ferrule is placed round the bottom of a stick to prevent the splintering of the wood. Its durability is such that, by the regular wear, the horn continues to grow and the hoof remains ever at its normal length. On the lower edge of the crust a groove is formed by a drawing knife (made for the purpose), with a guide, care being taken not to cut so deep as the thickness of the sole, nor so broad as the width of the crust. This groove is to receive a shoe which is not placed under the sole of the foot, but rather under the wall, being generally level with he sole and the frog as the natural foot, or after about three months' free growth of these parts. The frog, sole, and bars, being on the ground, preserve all their functions. In fact, the frog when large and thick, supple and elastic, in assisting to support, fills a most useful purpose. It is the principal organ of elasticity of the foot, which weakens the shock on the tendons and joints, and by its pressure on the ground, acquires sufficient consistency to give play to the flexible branches of the crust. Moreover, by its structure in the hinder part of the foot a kind of natural calkin or wedge, which strengthens the bearing on the ground and prevents the horse from slipping. This advantage is, above all, important on streets of towns, or on grassy slopes, and during all weathers. In heavy clayey soils another advantage is remarkable for hunters' and farmers' horses—there can be no suction.

It has been urged that, having removed the iron from the sole of the foot, the latter remained wholly unprotected from the sharp stones and rough ground. The horn having been allowed to grow, becomes hard and thick, and will be able to resist a sharp stone or any such substance, added to which the shoe being embedded in the hoof, no small stones or dirt can lodge between the foot and the shoe; the sole fills, also, the office of an arch, maintaining by its solidity the crust, and by its yielding under the weight of the body gives it play. The bars also serve for the firm support and expansion of the wall. The crust of the hoof should never be rasped, which, when thick, supple, and strong, resists shocks, and is elastic. The shoe, being only supported by the crust, does not want bevelling; it cannot injure the sole or heels, and never forms corns when it is well filled, and put in exactly straight on the crust. At first the groove should not be cut deep, but eventually, as the foot strengthens and grows, a deeper groove can be made. The Charlier shoe is as elastic as the crust, which it follows in all its movements of expansion. The contracted foot is enlarged, and regains its suppleness and health by the restoration of the circulation in its interior and normal functions. The shoe owes this power to its shape, and being curved as a spring, and to its fitting round the base of the foot. The new shoe is very light, and the horse is freer in his action. It is narrower than the shoes in ordinary use, which gives it an important advantage, in allowing the natural support of the horn on the ground. In order to increase its durability, the lower surface can be made broader; thus the external surface of the shoe follows the natural bend of the hoof. The height of the shoe is greater than its width, without increasing the length of the foot, being buried in the groove. The shoes are forged from bars of iron and steel mixed together, and can be readily made by one man at the rate of eighty to one hundred a day. Neither "calkin" nor toe-pieces are required; the frog is a natural "calkin," a kind of wedge on the slippery ground, sustaining the tendons, instead of straining them. In case of frost, two moveable nail calkins are fixed towards the heels of the shoe, and can be taken off when not required. The new shoe is suitable for all kinds of horses, and can be adapted as well for hunters as for draught animals.

SAND IN THE STOMACH OF SHEEP.

A CAHIR correspondent of the *Irish Sportsman and Farmer* says:—

"Some time ago (November) I bought a lot of sheep off the Kerry mountains, and I am now feeding them on turnips. A few days ago I lost one, and yesterday another; on opening, I found the stomach contained a large quantity of sand, and the livers of both were infested with a number of large fluke, even in the large blood vessels about the livers, and full of a moist clayey matter. Please say how I should treat the others in case they become ill. Would you recommend rock-salt in the field for them to lick?"

Our contemporary appends the following remarks upon the subject:—

We have found fine sand closely impacted in both the stomachs of sheep and the intestines, where the animals have been fed on pastures on the sea-coast in the neighbourhood of blowing sands, which, blowing inwards, the herbage, when damp, becomes coated with it; the hungry animals are forced to eat it in that state, and the sand, being heavy and indigestible, remains behind, and accumulates, till the animals at length die from want of nourishment and the impaction of the sand, which prevents anything passing through the intestines. In the case reported by our Cahir correspondent, those sheep must have picked up the sand in a similar way, either on the Kerry mountains, or some other poor, exposed, sandy pasture. In the vicinity of bare rocks, either of a granite or sandy nature, there is more of their exposed surfaces decomposed and disintegrated by the action of frosts, thaws, and atmospheric acids, and blown far off by high winds, than is generally supposed, and hence the origin of silica, mica, and various inorganic components in boggy soils in the neighbourhood of naked rocks.

Another case of sand as well as lead poisoning of sheep came to our knowledge a few years since. In a district composed chiefly of clay, slate, and alumina, where there were no blowing sands, several sheep had died under—at first—mysterious circumstances, and when opened, much sand was found in the stomachs and intestines; but where the sand came from was the mystery, till some of them were found licking some sand brought from a distance for making mortar, which, upon inquiry, was found to be the sandy deposit from the washings of lead ore —a mine of that mineral having been discovered and worked in the district, and in ignorance of its deleterious quality, it was brought and used with lime for mortar, and the remains of lead in the sand, sweetish to the taste, induced the sheep to resort to and lick the heap daily, so that a double poisoning was the result, viz., the indigestible sand and fine particles of lead remaining in the sand; but after the removal of the sand, there were no deaths of sheep on the farm.

It is a well-known fact, that in the neighbourhood of the lead mines in the county Wicklow, and at the smelting-houses, the horses employed, drinking the waters in those districts, are short-lived, from lead-poisoning, and that it is impossible to keep fowl in those places for any length of time. We give publicity to these facts, in order to shew the impropriety of grazing sheep or cattle in the neighbourhood of blowing sands or lead mines. T not, nor can there be, any effective tre for animals suffering from either caus the sand lodges in quantity in the bow when the lead-poison enters the syst quantity. Instant removal from the covered with blowing sand, before the taken in much of it, may secure the a and, in the case of slight lead-pois doses of Epsom salts may neutrali poisonous principle; but the only ef prevention will be to avoid such p altogether.

The following is the remedy given :— sheep have swallowed the sand with th age, for which there is no cure. Nei there any cure for flukes when they e such numbers, and the liver is so mu organized; but when in the early sta the disease, when there are but few flu dessert spoonful of spirits of turp mixed with twice that quantity of lins given daily, is an excellent remedy. should also let them have access t either rock or common, hay, and bruise mixed with linseed meal."

PARASITES IN ANIMALS.

THE first meeting of the Maidstone Farmers' Club was held last week, when Professor Brown, M.R.C.V.S., delivered a lecture on "Parasitic Diseases: worm in the throat of lambs, flukes in the liver, hydatids in the brain." Mr T. Bridgland, jun., occupied the chair.

Professor Brown, in opening his lecture, contended that parasites were charged with doing a great deal of mischief of which they were perfectly innocent. It did not follow in every case that because parasites were found in the system of a beast that had died from some obscure disease, that these parasites were the direct cause of death. It was common enough, in dissecting the body of an ox, a horse, or even a wild animal, to find parasites in many of the various o indeed there was hardly an organ e exempt from them.

Where parasites are present in the most necessary to the life of the anim course they do the most mischief. most dangerous parasite is that in the next those residing in the lungs, and those which attack the liver, where th injuriously by interfering with an imp part of the digestive process. In other they remain for a considerable p possibly for the life of the animal. I life and history of the parasitic orga there are many points which attract atte The parent worms do not necessarily pr progeny that resemble themselves, was a circumstance lost sight of for a great many years, and it was not until 1842 that a Danish naturalist discovered what is known as alternative generation, *i.e.*, that certain animals being themselves perfect in their organization, produced eggs in the ordinary way, but instead of certain embryos coming from those eggs like their parent, other animals quite different from the parent are the result, in some instances passing through five or six transactions, as in the fluke family.

THE ORIGIN, DEVELOPMENT, AND EFFECTS OF THE FLUKE WORM.

Commencing with the fluke worm, which was perfectly familiar to most of them, he said there were very few sheep-breeders who have not had some opportunities of studying the worm in its site, and learning some of the effects which it produces in the organism. The flukes are found in deer, in the ass, in cattle (particularly foreign cattle), and in the beasts of the Zoological Gardens different varieties are found, but as far as they knew, the sheep is the only animal which suffers very considerably from them. Cattle never suffer from them, for he had met with them in the slaughter-houses in the livers of fat bullocks, but had never been able to associate with their presence any deranged condition of the animal, and the same is the case with the deer and wild animals. In the sheep, however, there can be no question that the flukes either produce the mischief themselves, or the circumstances under which they occur are injurious in their effects. The fluke worm occurs principally in low, damp situations, marshy lands, generally where there are large numbers of freshwater snails. The animal is bisexual, that is, every individual fluke is both male and female, and has the horns of both sexes in its body. In all amimals there is an immense number of eggs, which are thrown off and carried into the intestines, and from the intestines are thrown out in large numbers with the manure, and from this it is easy to understand the succeeding stages. In lands which are very high and dry with the sun shining upon them the greater part of the year, in what they called parched-up pastures, they were quite safe against attacks of rot, and also on land near the sea, where the earth is impregnated with salt, for salt is very unfavourable to the development of the embryo; but in lands where there is fresh water, there they had the conditions under which the embryo flourishes. The last stage of the fluke worm development is where it becomes parasitic to the liver of the snail, and the cause of the affection of the sheep is the swallowing of those small snails. The liver becomes diseased, and the animal at first gains fat apparently from the stimulus which is given to the liver in the first instance, then the animal begins to fall away, there is a shrinking of the muscles, the formation of the bag, as the shepherds call it, under the throat, a general derangement of the condition, eventually terminating, unless something is done to prevent it, in the animal's death. It is clear that to prevent sheep rot they must be kept out of marshy places; but in certain localities it was not easy to do so, for they picked it up as they were driven from one fold to another. Under all circumstances, however, it was possible to prevent sheep being driven along those dangerous places where the rank grass flourishes, and if the shepherd were aware of the danger, he would take more care to prevent it. They could prevent the sheep from feeding on marshy places, and put them on grounds which are well drained, as all well farmed land ought to be, and see under no circumstances in those seasons when they fear an outbreak of rot that the animal falls away in condition, for they must either supply it with artificial food or take the risk. In the majority of cases it was quite possible, by keeping up the animal's condition, by supplying it with artificial food, keeping it out of suspicious places, and by adding to its food a certain amount of salt periodically, to prevent the animal from being affected with the fluke or any other parasite. After the disease has broken out it is desirable to keep them under cover, and find them dry food, but if that plan cannot be adoped, the best plan would be to supply the sheep with a proportion of good hay while feeding upon damp pastures, so as to keep them from any of the objectionable herbage if possible. When it is fully developed, no treatment is of the slightest use, and unless the animal can be removed to some high and dry situation, nothing can be done; it does not matter how poor it is, so that the animal may have to work to get its food.

THE HYDATID.

Passing on to the second part of his subject, he said the hydatid was known to the earliest writers many years before the speculations as to the animal nature of the parasite arose, and the white spots which are to be seen upon it were attributed to a blow on the head, but after a time it began to be suspected it was really an animal. Mr Hewitt first, and others, came very nearly to the truth, but it was not till 1852 that a German pathologist made the discovery that those clusters were mere tapeworms, and that the water bladder found in the intestines of the sheep, and frequently on the brain, is derived from the eggs of the tapeworm. But then the question arose how the eggs of the tapeworm were swallowed by the sheep, and this was, no doubt, caused by their having been dropped by a dog going over the ground, as the intestines of that animal contain several species of tapeworm. The changes are not complex. First, there is the hydatid, which is a bladder having a tapeworm head, and this hydatid is swallowed by another animal, the tapeworm passes into the intestines, the joints grow one by one, when the last segment falls off, a perfect animal itself. The segment having fallen to the ground, is taken up by another animal, and instead of producing another tapeworm, the eggs or embryos bore their way through the structures, and ultimately reach the animal's brain, always going in a fixed direction to the brain of a sheep and the liver of a dog. The origin of the hydatid is in all probability the shepherd's dog; of course the fact of not keeping a dog does not prevent it entirely, for any stray dog might run over the farm, and if one dog only dropped a few segments of the tapeworm, the mischief is done. An immense number of embryos are burnt up by the sun, crushed out of existence, before being swallowed by the sheep, or else from the number of dogs, and from the number of tapeworms in their intestines, the evil would spread over the whole country. He instanced a case on Salisbury Plain in 1852, where a singular fatality occurred amongst the sheep, nearly all being lost out of a flock of two hundred; it was on that particular spot that the owner was in the habit of exercising his greyhounds. The prevention of hydatid in the brain is perfectly easy where a dog is kept on the farm, the best plan being to give periodical doses which expel the worms; the common beetle-nut is a most deadly enemy to all the tapeworm family, and 2 or 3 drachms of this grated up and mixed with the animal's food now and then, will render the sheep perfectly free from the tapeworm. The best treatment of giddy sheep is the immediate consignment of it to the butcher, and he shewed that all the methods proposed for the extrication of the hydatid are useless, as if it is extracted it does not prevent the hydatid growing again, and another might form almost directly.

THE THREADWORM.

Touching upon this subject, Professor Brown said that the embryo is a very small one, and from it lambs have suffered more severely than calves. After mentioning the symptoms that indicate this parasite, he stated that when the lamb dies, the little worms are found accumulated in large masses in the tubes of the lungs, and the animal's death is caused by partial suffocation and general debility. Under these circumstances it is not of the greatest importance to ascertain the cause or origin of the parasite, but to devise some means for its expulsion. Old sheep are affected with it as well as lambs, but in the former case they do not suffer so much, though they are capable of infecting the pastures to a considerable extent, and if the embryo finds favourable conditions, the damage is great. Here they found moist seasons most favourable. So long as they have the eggs thrown out by the older sheep, so long must they expect the lambs passing over that land will take up an abundant quantity of the embryo. The eggs which these worms contain in the embryo, do not affect the sheep which take them up. If they were passing a flock of adult sheep over a piece of pasture, it might be assumed they drop an immense number of eggs over that pasture. If they took directly a number of young sheep over the land it does not result that they are affected, shewing that in the condition they then are they are capable of affecting any animal which may take them up, but as in those transitions which occur in the fluke family, in the hydatid family, some changes of a similar kind must take place in the embryo of the round worm before it is rendered dangerous. The Royal Agricultural Society has given Professor Simonds instructions to examine into the subject, and the inquiry is now going on, but nothing material can be discovered, more than what is at present known, as to the means of abating the progress of the disease. One of the most important means of prevention is to keep off young sheep from the lands which have been fed upon by older ones. If this were done throughout the country, the loss would not altogether cease, but would become so materially lessened as to be no longer a matter of serious consequence as at present. The next step in the way of prevention would be to treat the lands which had been fed over by the older sheep, and, for this purpose, lime and salt may be used, both being destructive to the germ of this parasite, and a top-dressing of lime and salt will do good to the land, as well as destroy the parasites. The treatment of diseased animals is quite a separate question, and requires a great deal of care and attention, the fact being that there are no means of directly destroying this parasite in the body of the animal without doing the animal a great deal of damage, and consequently all the remedies which are devised must act indirectly to be effectual. Small doses of turpentine frequently administered, and spirit of turpentine mixed with the yolk of eggs or a little glycerine, is an efficacious agent, but the best way of destroying it is by applying some irritating gas, such as chlorine gas (very easily produced), sulphurous acid gas, or carbolic acid gas. The grand secret in parasitic diseases was that the animals should be kept in good condition.

The Dairy and Poultry-Yard.

SPRING CHICKENS.

A CORRESPONDENT of an American contemporary makes the following seasonable remarks:—

Very early spring chickens are generally dear, and pay extraordinarily well for raising, and they are much easier brought through the cold weather of the latter part of February and following month than people suppose, and as practical knowledge is worth much more than aught else, what I am going to say can be done, and has been accomplished extensively by the writer and his better half. Having little birds, rather larger than pigeons, sell for 75 cents each in April and May, giving 1 dol. per couple clear profit, is making money fast enough to satisfy reasonable people. The way to do it is to have the hens all comfortably lodged in a warm roost by the 1st of January. Have some nice snug, warmly situated nests in a place near the roost for the hens to lay in, and contrive that they can go to and from without going out into bad weather, and if they have been well fed they will be laying when the new year begins, and if Brahma blood is in them (half will do), they will sit by the end of the month; after hatching, put them in coops which can be closed and made dark by fastening up a front board—then in bad weather the chickens can be fed by letting down the board, and be shut up again as soon as they have eaten, which will cause the hen to sit still and nurse them till they are fed again; have no bottoms to the coops, and move every day, putting dry fine straw of any kind of litter under the coop when the ground is wet, but in moderate weather, or whenever dry, let them be on the sod. Keep the hen confined till the chickens are a month old, unless unusually mild, and let these coops be on a slope facing the south, and away from the haunts of the old fowls. There are many days in February when the chickens around the coop picking blades of gra enjoying the sunshine, which puts strong health to bear closer confine cold spells and during snow storms with these coops, do not hurt them and there will be no drooping wings crying, as there invariably is whe chickens are raised in glass hothous any kind of houses or barns; for in these places they miss the fresh grou daily moved on, and the fresh air a shine which give them an appetit doors which they lose in-doors, spacious the apartments may be. I h to dig the snow away from the coops times in one season, and brush pl them to be placed on, which is quick by having a spare coop and going fr to the other; and by ten or eleven the whole of the broods, from t forty coops, would be seen as brisk a dozen or more at each coop, and ra meet the feeder.

The feed requires variation, and sh given every two or three hours—say scalded meal at seven o'clock A.M. or barley at nine—cracked corn at t liver or other meat chopped fine, at —and bread sopped in milk with oat dry grain, at four, and then shut up day, egg shells broken fine, mixed morning's first meal, and give one some kind of sprouted grain in about stage as malt is made, and vary this as convenient, and as the chickens prefer one form to another; for genera they liked best is best for them, as seldom gives desire for that which good—and in case of anything be rich it will cloy them till the system

SOME POINTS OF BUTTER-MAKING.

The production of milk for butter-making is essentially the same as that for cheese-making. There is this difference to be observed, however: For cheese, we look principally to the quantity of caseine in the milk; for butter, we must consider the yield of cream entirely. Cows must be selected accordingly. For both purposes, the same care as to cleanliness, quality of feed, purity of water, and gentle treatment of the cows should be observed. The milk in both cases needs to be aired and cooled soon after milking.

From this point, quite different handling is required. For cheese, we constantly agitate the milk to keep the cream from rising; for butter, we must set the milk to rest as soon as possible, and not only avoid all stirring, but not allow it to be even jarred. The more perfect the rest, the more completely the cream will rise.

It is still a subject of debate as to whether the cream rises better in shallow or deep dishes. But it is certain that it will rise in either kind of vessel, if all the other conditions are right. The tendency is toward setting milk in deep pails, and in large masses. Recent experiments favour shallow pans.

There is no dispute as to the propriety of cooling the milk, or of keeping it in a moist atmosphere, and in a light room. Moisture prevents the cream from drying on the surface and making flecky butter, while light is essential to develop the colour so much desired.

The temperature, it is asserted, may be allowed to go lower for butter than for cheese. We would not allow it to go below 55 deg. for butter, and believe it would be better to keep it at 60 deg. The best temperature for churning is admitted to be between 60 and 65 deg.—the latter for cold and the former for hot weather, making a mean temperature of 62 to 63 deg. as the proper point. Possibly different dairies may require a slightly different temperature. The cream should be allowed to become slightly sour, if a good keeping article is required, but care should be taken that the cream does not get too old and seriously injure the flavour. Sweet cream makes the best flavoured butter, but the yield is smaller, and it does not keep as well.

The best method of churning has not yet been determined. Many patent churns have been presented to the public, but none of them have been any real improvement on the old-fashioned dash churn. There is some dispute as to what causes the separation of the butter from the milk. Some say it is the concussion; some that it is the incorporation of the air with the cream. Certain it is that agitation is necessary. Forcing air through the cream while agitating it, makes the butter separate quicker, but it injures the quality. What is wanted is some method that will agitate every particle of cream alike, making the butter all come at once and of the same texture. By every method yet devised there is some cream at the sides, corners, or ends, that does not get so much churning as the rest. This lessens the yield and makes the quality uneven. At least a half-hour should be consumed in churning. Where the milk is churned it is allowed to change somewhat. The yield of butter is larger, but it contains more caseine, and is therefore inferior. More power is required to churn with.

If the butter comes firm and solid, and separates freely from the milk, but little working will be required to expel the butter-milk. The less it is worked the better, if the butter-milk is got out and the salt is evenly incorporated. It is better to wash the butter than to work it too much without; but whether worked or not, the butter-milk must be expelled, or it will injure the flavour and the keeping quality. Indeed, it is asserted that pure butter will keep almost indefinitely without salt. But such butter cannot be produced by the ordinary process. So salt must be added to make it keep. The quantity used by our best butter-makers varies from ½ to 1 ounce of salt to 1 lb. of butter. Some salt considerably higher and go entirely by the taste. Enough salt should be used to convert the remaining butter-milk and water into brine, or the butter will soon lose its flavour and become rancid.—*Albany Country Gentleman.*

DRYING UP COWS.

IS the cow an artificial production when in the dairy, or is she an animal in a state of nature, and is there any necessity for drying off a cow two or three months before calving? The *American Agriculturist*, in a recent article, denies the necessity of drying off cows a short period before calving, or even at all, on the ground that while in the dairy, the cow is but an artificial production, as much as the improved turnip or carrot which she eats. The theory is, that as the increased demand on her physical resources as she approaches parturition is so gradual, it is difficult to tell the exact moment her milking should be suspended; that it certainly is not two or three months, any more than three or four months before coming in. This logic, by inverse reasoning, would lead to something like the following conclusion:—That if it is not necessary to dry off a cow three or four months before calving, it is not two months; if not two months, it is not one; and if not one month, it is not necessary at all. And indeed this is just the premise assumed, and in proof, instances are cited where cows were milked up to the time of calving, resulting in no injury to either the cow or the calf. This practice might answer (says a correspondent of *The Albany Country Gentleman*, for the dairy, if indeed it is the best policy for the dairyman to render the cow as much as possible an artificial creature, to the total disregard to her condition in a state of nature. But I seriously doubt the economy of this system, even for the dairy. Too much of the artificial reminds us rather unpleasantly of the basement dairies of some large cities, fed on still-slops, and milked not exactly through the various changes up to the time she drops her calf, but through the various stages of blindness and carious teeth to dropping of her tail, and until she finally drops herself.

In utilizing a natural element, when it is discovered that the utility is enhanced by converting the natural into the artificial, the tendency often is to carry art to the extreme, and eventually defeat the purposes of both nature and art. I think the observation of dairymen and stock growers will bear me out in this assertion, the truth of which is amply attested by the impaired constitutions and the numerous diseases of domestic animals too artificially bred and reared.

That some cows may be milked continuously is very true; in fact occasionally one is found that it is extremely difficult to dry off; but to adduce from these exceptional—I might say abnormal—cases, a theory for general practice, would be pernicious for the farmer at least who would maintain a vigorous and healthy herd, and who either for home use or market, raises and fattens his own beef, as well as furnishing wholesome milk, butter, and cheese: and I think it questionable if in the long run it would not be to the advantage of the dairyman proper to give his cows a respite before calving. So far as the calves are concerned, as they are mostly "deaconed," it matters not what their lack of development may be, but when they are to be raised, if only for veal, they should not be robbed ere they are born, nor deprived afterwards of their sanitary food, which nothing can supply like *absolutely new milk.*

It may be admitted that though a cow is milked up to the time of calving, the increased demand upon her resources can be met in a great measure; and yet it seems to me it would involve an excess scarcely to be met by the best of treatment or the most generous feeding. It looks to be a little too much of the artificial, for it must not be forgotten that she is artificially made to produce more milk than in a state of nature. With adequate supplies she could, in a state of nature, be milked continuously with less deleterious results, because her resources would not be so depleted by the copious flow of milk induced by artificial management.

The Naturalist.

WOOD-PIGEON DESTRUCTION.[1]

ALTHOUGH I am no advocate of any form of bird-murder, I cannot but consider the wood-pigeon to be, at this time of year, in every sense fair game. There are few sportsmen who would hesitate to let fly at one when the chance offers, for they are wary birds, quite able to take care of themselves, and in points of size and quality no despicable addition to the bag, while beyond all this, they are in certain quarters denounced as perfect pests, and their total abolition is demanded not without considerable show of reason. I have therefore no compunction in furnishing your readers with a description of the manner in which wild pigeons are taken in the Pyrenees, which may be new to many, as the method of capture is not given in the best known ornithological works; at the same time it will be seen that it is an undertaking requiring considerable labour and outlay, and one which would hardly be pursued except as a profession, and it may be doubted whether a market could be found for such a quantity as must be taken to make the affair pay in a country like England, in which the term game is of much more restricted application than in France, and where any new kind of food is very slow in obtaining general recognition.

The best known station of the pigeon catchers in the Pyrenees is at Bagnères de Bigorre, though similar "Palombières" may be seen in other parts of the chain, and a similar "chasse" exists in Italy. In the ridge of one of the lowest spurs of the mountains which run north and south, is a long double avenue of lofty elm trees—perhaps 500 yards long—in which are here and there spaces, as if a single tree was missing. Wherever such a gap occurs, long spars are lashed to the upper branches, and by means of blocks and pulleys a net is hauled up, filling the blank space, which must be of 80 feet by 40 feet at least. About 20 yards to the east of the avenue, and at the side of each gap is a crow's nest, a tripod of light spars about half as high again as the trees, to which the fowler climbs by a crossbar ladder, while at the foot of the trees a screen of boughs is erected, behind which crouch a couple of boys who manage the ropes sustaining the nets. At the proper season, *i.e.*, about the beginning of October, the net is got into position, and the "chasse" begins. The birds are then congregated in flocks, and flying low over the hills about sunset approach the snare. When they are within what the fowler, perched in the crow's nest, considers to be fair range, he throws up a lure, the whizzing sound and appearance of which is mistaken by the pigeons for that of a hawk, and, as Mr Barr's experiment at Hendon shews to be the case, they obey a natural instinct by making a sudden stoop and dart between the trees, striking the net; at that instant the boys concealed behind the screen let go all, and the net and pigeons come down together.

On the occasion when, during October last, I walked out from Bagnères to see the sport, I was not lucky enough to see a catch made, though I waited until after sunset, when the fowler descended from his perch and the nets were hauled down. Bad sport had made him grumpy, and I failed either to ascertain the exact nature of the lure or the kind of wild pigeon which is taken; but the previous day, while crossing alone by the Hourquette de Barane from Pierrefitte, I found the valley full of pigeons, of which many passed within gunshot of me, and I have little doubt that they were stock doves (C. œnas). It was very interesting on this occasion to sit as I did on a peak close beside the Col (6232 feet enjoying the magnificent view flooded in cloudless sunshine; nothing living was in sight, except when at intervals a flock of pigeons came up from the valley, mounting gradually, and carefully choosing the lowest ridge for their passage; over this they skimmed, almost close to the ground, and, darting down the steep descent, were out of sight in a moment. I noticed that their flight was still from east to west, and was taking place at mid-day, as if in obedience to some migratory instinct, rather than the purpose of seeking food which, if it consisted of beechmast, was certainly more abundant in the valley they left than in the one they were seeking; and all the nests I saw were, as far as I could judge, stretched more or less north and south, subject to some slight inclination from these points of the valley in which they happened to be situated. Whether the method of capture which I have attempted to describe would suffice to take English pigeons, I am not prepared to say; but I believe that in some places on the border a gunner concealed behind the ridge of a hill may obtain a great many shots as the birds fly over in the evening, and in such a place the experiment might be tried. I have already expressed my doubt as to whether it would pay as a speculation, but if the object be to diminish the numbers of a farmer's enemies, I may mention that the "chasse" is said not to be so productive as it used to be, though this may be as much from greater wariness of the quarry as from diminution in their numbers. I imagine that the form of the lure is not of great importance, for while I was watching the nets a flock flew over out of range, but near a house in the course of construction, a little way off; the mason immediately threw his hat at them, and though I am bound to say they took no notice of the manœuvre, it is only reasonable to suppose that he thought it possible that they might be deceived by it.—*J. B., in Land and Water.*

ARTIFICIAL PROPAGATION OF SALMON.

The following interesting paper on the artificial propagation of salmon was recently read before the members of the Chester Natural Science Association, by Mr W. F. Ayrton. He said:—

For some years at the commencement of this century, the attention of ichthyologists had been, by various researches, drawn to the artificial propagation of fish, and in 1840, John Shaw, of Drumlanrig, published his remarks on the subject, which obtained general acceptance. It was not, however, until lately that the system was adopted as a matter of commercial speculation in this country, by the late Thomas Acsworth, who purchased the extensive fisheries in Galway, and introduced it there. It was a correspondence with this gentleman which led to my thinking it applicable to the Dee, and in 1863 a company was formed for the purpose. Our company had two objects in view; first, to assist the River Dee Fishery in their endeavours to prevent the illegal killing of the salmon in the fence months, and the destruction of the young fry; and, secondly, to realize if possible, by the legal capture of salmon, means to defray the expenses of artificial propagation, which we entertained hopes would greatly restore to the Dee its former abundance of fish, and again render it what it once was, a river noted for its yield of salmon proverbial for their superior excellence and value.

With this view, we took the salmon cage at Chester, which had been for many years notoriously abused in hands indifferent to any objects but those leading to immediate profit, and unscrupulous as to any evasion of the law in the take of fish. We looked out for a spot suitable for our scheme of artificial propaga-

and found a very suitable one at ton, where we met with the most liberal ordial support from Mr Peel, of Bryn- , who gave us a *carte blanche* to establish nursery, wherever we thought it most enient, on his property. Here we lished our several boxes for receiving ova, and engaged three fishermen whom d confidence in to stock them at the r season. The 27th of March 1854 a red letter day to me, for on going to ton I had the gratification of seeing the young salmon hatched and swimming t in the boxes. This year we had but erent success. Many of the ova per- in the boxes, and we found the young when hatched, were destroyed by the shrimp, which, notwithstanding all our and watching, we could not exterminate. 56, we succeeded in rearing and eventu- urning into the river 10,000 young sal- 20 per cent. of which we marked by ng off the adipose fin. In 1857, we were successful in filling the boxes, and in ssfully hatching the ova, which were, as e, turned into the pond at their proper . On emptying the pond in October, ere exceedingly surprised and disapped to find only a few fish there; but the ery was explained when the pond was y, by finding a couple of large trout, h had, no doubt, been maliciously thrown the express purpose of devouring the which they had of course done to their s' content. This determined us on doning the project of stocking the river tificial propagation.

y own impression was, and still is, artificial propagation may be useful ock an absolutely barren river, but that river already supplied with fish they keep up that supply much better thems if only allowed the opportunity of so, and that the money required for cial propagation would be much better nded in watching the river to prevent l poaching and to protect the fish in pawning season. While engaged in this cial propagation, it struck me that op- nity was afforded by actual experiment, of ascertaining a much debated point at that time, as to the best time for transporting ova to a distance for the purpose of stocking or replenishing rivers which required such assistance. I therefore had sent me from the nursery at Overton ova in various stages of development, and a microscopic observation of their progress led to my making drawings. There are, perhaps, few objects which from their translucency afford happier opportunities for microscopic observation than the ovum and embryo of Salmonidæ. Their marked progress from day to day, the changes which take place as the various organs receive fuller development, some features of the earlier embryo disappearing or becoming absorbed, as those of more advanced maturity assume their place; others becoming more defined, and more easily recognized in their approach to the form of the perfect fish, until the delicate and transparent vessels of internal organization are at length gradually clothed with more substantial fibre, and are finally hidden from view; these present, altogether, a series of natural phenomena as interesting, and perhaps as easily traced, as any which occur to the zoologist. The appearance of the ovum for the first five days after impregnation presents no decided organization. A nebulous opacity at one spot indicates the embryo, which is surrounded by oil globules, and which continue to supply it with nourishment until the entire absorption of the yolk in the fully-formed fish. Thirty or forty days after the impregnation of the ovum (according to the temperature of the water in which it remains), the embryo may be distinctly seen to have assumed a definite form, though still of a glutinous fluid character rather than of a solid consistence, the only exception being the eyes, which first attract notice from their early development. On looking at the ovum thirty-seven days old with a lens, I found the embryo fully formed, and could observe its spontaneous movements. With a microscopic power of magnifying 200 diameters, the heart appeared in full action, the eyes formed, the principal bones of the head and vertebræ defined, the circulation of the blood in the principal vessels, as well as the form that the granules of the blood took, and by which the circulation was made manifest. The embryo was, however, quite or nearly translucent, and the old globules clearly defined through the intervening parts of the fish. Up to this date there was no distinct indication of the fins, further than as we saw them immovable and quiescent. But at the age of forty-four days the pectoral fins, though still in structure most delicate and perfectly translucent, become disengaged from the body and from that time forth were incessantly in motion. The yolk had by this time become covered with a network of vessels, through which the blood poured in streams over and among the numerous oil globules. Perhaps the most interesting period for microscopic examination of the young fish is that of the first twenty-four hours after its liberation from the egg. The tissues are then so exceedingly delicate that the circulation is wonderfully apparent; more so than in a previous stage, because the enclosing integument of the egg no longer intervenes, and more so than at a later stage, when it is hidden by the development of muscular fibre. I had both in the yet unhatched ovum, and in the liberated fish, noticed currents of blood, apparently issuing from the liver, traversing the yolk and returning to the heart from one large vein on the opposite side of the yolk, but I could trace no artery supplying the liver. On examining a young fish not many hours liberated from the egg, I found a vein returning from the lower extremities of the fish, which passed through an orifice in the body, immediately opposite the liver, thus supplying the liver with blood. A few hours later this orifice was hidden by the formation of muscular fibre and the direction of the vein concealed. Pigment cells appeared in the head and back of the fish at an early stage of the ovum, and multiplied daily after hatching, until at fourteen days they began to produce an assimilation to the future markings of the fish, which were completely defined at fifty-three days old, the length of the fish being then 1⅛th of an inch. I repeatedly found that the ova were more healthy, and survived longer if they had arrived at such maturity as shewed the form of the fish well defined and the blood in full circulation.

The Country Gentlewoman.

THE PARLOUR GARDENER.

CHAPTER XIII.

THE DOUBLE WINDOW.

Advantages of a Double Window—Their Use in the North—Glass Stands—Plants proper for the Double Window.

AFTER having done our gardening in the parlour, wishing for a little more room in which to pursue it still further, we came out-of-doors. Here also our work is completed. Let us then go in again.

In all countries where winter brings in his train a long succession of vigorous colds, in order to guard the better against these, the inhabitants, instead of having in their windows but a single sash, use the wise precaution of having two—the outer one even with the outside of the house, the inner one even with the inside wall of the apartment. Thanks to this arrangement, the cold reigning without is so far excluded that a mild temperature is preserved in your chamber, while, at the same time, there remains between the two sashes a vacant space which is at your disposal for any uses to which it is susceptible of being put. It is the very thing for our gardening purposes.

By the Dutch, this space is dedicated to canary birds, which they understand perfectly how to rear, Holland being the country of all others where these birds do most abound. There is nothing, however, ladies, to prevent you from appropriating it to your favourite pets—flowers.

It is evident that whenever the interior sash is kept open, the interval between the two sashes receiving, as it then does, a portion of the atmosphere of the chamber, will of course be of the same temperature. This space, then, is equivalent to a little conservatory, either merely tempered or hot, according as the person who occupies the chamber is more or less chilly; and in this temperature all the cultures that can be conducted on a large scale in greenhouses, tempered merely, or hot, are equally possible on a small scale in the double window.

PLANTS PROPER TO BE PLACED HERE.

Place on the shelves of the glass stands at the two ends of the window-sill plants of a low and tufted nature: first, on the upper shelves, such as, without being precisely climbing or running plants, are taller than they are broad. There is nothing of this sort more graceful than the shrubs of the genus Grevillea. On the front or lower shelves place small plants which bear many flowers, such as the Kennedyas and the blue Lobelias of Surinam. Arranged in this manner, will they not be in your way when you wish to stand close to the outer sash to look out at the wintry scene, as a contrast to your tropical garden within. Your double window is an excellent place also for making a display of the plants you have obtained from seeds and slips reared in the hot portable greenhouse. Your choice is not a limited one by any means. In the course of my instructions, I name only some of those which I consider as most worthy of your attention. What I shall say in regard to their culture will be a sufficient guide to you, should you desire to admit into their society others that require the same temperature.

The double window can also lodge, very much at their ease, plants of the order Gesneriaceæ (consisting of tropical herbs with green foliage and showy flowers), of the three genera, Gesneria, Gloxinia, and Achimenes. I have already had occasion to remark with what perfect docility a leaf, or a mere fragment of a leaf, from a plant of this last-named genus will take root when we wish to propagate it by slips.

The Gloxinias are not less accommodating; their foliage resembles the most beautiful green velvet, and their flowers, in the form of a goblet, have in the inside a large spot, which is always of a different shade from the flower itself. The Gesneriaceæ require a great deal of water and of heat; they must be watered several times a-day, and whenever you have reason to fear that they may be seriously injured by the cold at night—which would happen only when it freezes very hard outside—you will take the precaution of placing them on your mantel-piece for the night. Their bloom continues very long, and will fully recompense you for your trouble. Treat in the same way the Brunsfelsias, the Torenia asiatica, the Ixoras, and the small Begonias, which, in company with each other inside of your double window, will constitute a charming parterre taken from the tropical flora.

Do not forget to add to the above one or two plants of the Sparmannia, a native of the Cape of Good Hope. In this pretty plant you may observe, while it is in bloom, the phenomenon of *retractility*—with a contrary effect, however—which renders the Sensitive Plant so curious. Touch delicately with the end of your finger the summit of the stamens of a flower of Sparmannia in full bloom; instead of modestly closing, in imitation of our gentle Mimosa, they will forthwith scatter, spreading out in every direction with a brusque and instantaneous movement. Some time after they will return to their former position. This property of the stamens of the Sparmannia, less generally known than that which manifests itself in the closing of the leaves of the Sensitive Plant, is not less curious or interesting to observe.

CONCLUSION.

And here, my dear ladies, ends the series of notions upon Horticulture in the House I proposed to give you. Can the Parlour Gardener flatter himself with having inspired you with a little interest for those plants that you already loved without knowing it—for yon were predisposed by your nature to do so—and that you will love better and better in proportion as you know them more? One thing above all ought to have struck you in the course of our discourse: it is, that in all that I have taken the liberty to recommend to you, there is not a single process that each of you cannot practise by yourself; not a single culture that you cannot succeed in by conforming to my hints. Success in our undertakings, whatever the thing may be that we undertake to do, is always pleasure—often happiness.

Let us understand each other, however. I do not pretend that everything you do will be always crowned with success; you will often go wrong, and then your attempts will necessarily fall through: this is inevitable. But this much I can promise, and answer for —that with a little reflection you will always be able to discern the cause of your failure; and this being seen, you can then begin again, and obtain from a second attempt what you could not from the first.

My dear ladies, I shall enjoy the pleasure —in imagination, at least—of seeing you engaged in adorning with these beautiful children of Flora, first your mantel-piece, next your *etagère*, then your flower-stand, your balcony, and your terrace, all in due succession. I can picture to myself the liveliness of the satisfaction with which you will watch the growth and the opening of the first bud of the first Camellia, grafted with your own hand, and that also with which you will gather the first fruit of the first Cherry tree that you will have forced under my direction. No doubt the ladies of your acquaintance will take pleasure in following your example—this inoffensive taste for gardening is also a growing and spreading thing. Permit me, then, dear ladies, to indulge the hope that here will spring out from all this—amid st the Violets and Mignonettes—a little kind recollection of

THE PARLOUR GARDENER.

THE

JNTRY GENTLEMAN'S MAGAZINE

APRIL 1872

EDUCATION IN ENGLAND.

E education of the people, as deter-
mining the amount of their intelligence
:ir appreciation of improved methods
ndustrial pursuits, has unquestionably
:t bearing on agricultural labour, on
.cturing skill, and on commercial ac-
It is equally certain that the Elemen-
lucation Act (1870), introduced by
ırster, while producing in some places
nt harmony, has, in others, created
lifferences of opinion and harsh dis-
especially where rates for the support
›ols have been levied by the newly
School Boards. Under these cir-
nces, we may do good service by pre-
; to our readers a short but complete
of the subject. Our remarks will be
:d to the state of education in England
'ales. We shall shew by figures the
t and progress of such education, and
re its position with that in Scotland,
countries on the Continent. We shall
:e the quality of schools, especially in
ı agricultural districts, and shew their
ıpon the morals of the people. All
.tements will be drawn from personal
:nce, and from "blue-books" presented
iament.

land, from the very time of the Refor-
down to the present, has had an ad-
:, or at least complete and intelligible
of parish schools; but in England the
ıs begun under unfavourable circum-
;, with no clear method, and with pain-
ıs, amid fierce religious contests. Yet the progress of education in England has been astonishingly rapid, as the following figures prove.

In 1818, a Committee of the House of Commons was appointed to obtain returns of all schools, distinguishing those established since 1803. Of this Committee, Mr, afterwards Lord Brougham was the chairman. Similar returns were obtained in 1833 by another Committee of the House of Commons, presided over by the Earl of Kerry. In 1851 (the year of the First Exhibition in London) a complete census of schools was taken by the Registrar-General, as a part of the general census. In the middle of the year 1858, another census of schools was obtained by the Royal Commission on Education, of which the Duke of Newcastle was the President. Now, what was the position of education at these periods? In 1803, the number of week-day scholars was 524,241, or 1 in 17½ of the total population of all ages at that time. In 1818, the number of such scholars was 674,883, or 1 in 17¼ of the population then. In 1833, the number rose to 1,276,947, or 1 in 11¼ of the whole population. In 1851, the number of scholars was 2,144,378, or 1 in 8.36 of the population in that year. In the middle of the year 1858, the number was 2,535,462 or 1 in 7.7 of the population. We have of course been describing the *quantity* of education in England, not its *quality*.

It will be interesting to compare the position of Education in England and Wales with that in certain other countries. In Prussia, the proportion of the whole population at school is 1 in 6.27; in Scotland, it is 1 in 6.6; in England and Wales it is, as we have seen, 1 in 7.7; in Holland it is 1 in 8.11; in France it is 1 in 9 exactly. Thus we perceive England and Wales are less advanced than Prussia and Scotland, but before Holland and France.

We observe, in passing, that in Prussia education is compulsory, that is to say, every child is forced into school by law, the parent or guardian being subject to severe penalties, such as fines, and in default of the payment of these, even to imprisonment itself, in case of the non-attendance of the child. The principle of compulsory education is being mooted by several School Boards in England, and in many instances giving birth to angry conflicts and bitter feelings. Our conviction is that the principle is not suited to the political and social circumstances of England, where central administration is not so paternally despotic as in many foreign countries; that the machinery necessary to seek for absentees from school and ascertain in each case the cause of non-attendance would be found exceedingly expensive; that to fine and imprison poor parents would render the schools and the very name education the objects of their most rooted detestation; and that, looking at the rapid progress education has already made in England by natural growth, as shewn by our statistics, such a principle as compulsion is not necessary.

We further assert that it would be futile to apply the principle in agricultural districts. Here the assistance of lads is required in several departments of labour on farms, but the lads require to be early in life inured to rough, cold, and changeable weather, and that to prolong their attendance at school up to the age at which boys in towns remain there, would unfit them for the labour by which they must in future earn their bread. We add, further, that agricultural work is not "unskilled labour," as it is often unjustly characterized, but that it really requires a long apprenticeship. It requires judgment, and this can be obtained only by early watchfulness and experience. To learn to guide a team, to observe the habits of various animals on a farm, to watch the changes of weather, to gain a knowledge of the various agricultural implements and machinery, to know one crop from another, all demand an early experience of labour, which is incompatible with prolonged attendance at school. The truth is, if non-attendance at school does really prevail to any great or alarming degree, we must look for it in cities and towns.

In agricultural districts in England, the Rev. J. Fraser, now the Bishop of Manchester, shewed, when Assistant-Commissioner in Somerset, Herefordshire, Worcestershire, and Devonshire, non-attendance at school was not excessive. The young were sent for instruction with tolerable regularity, up to an age when they could be employed usefully on farms and in gardens. The workhouse boy, for instance, who lives in-doors and attends school to a comparatively advanced age, cannot compete with the labourer's boy brought up at home. At least he is not sought after by the farmer. He has learnt to handle a spade, but he has never handled harness; he knows nothing of the farm-yard, and he is not inured to weather. Agricultural employment among children brings entirely into play eminently distinct and important qualities, indeed qualities of a superior kind in many senses to those called into existence and developed by the mechanical and monotonous labours pursued by children in factories, mills, printworks, &c.

Raising and lowering at a certain angle a small piece of wire, or spreading colouring matter on some piece of material when an approaching roller arrives at a given point, and doing this from morning till night, from year's end to year's end, as in the case of children in factories, mills, &c., is sufficient to deaden or stupefy the faculties. The variation, however, in the employment of lads on farms caused by the change in the seasons, and the necessity to adapt means to results, must tend less to intellectual stagnation.

What says Adam Smith in the "Wealth of Nations?"

> The man who works upon brass and iron, works with instruments, and upon materials of which the temper is always the same or very nearly the same. But the man who ploughs the ground with a team of horses or oxen works with instruments of which the health, strength, and temper, are very different upon different occasions. The condition of the materials which he works upon, too, is as variable as that of the instruments which he works with, and both require to be managed with much judgment and discretion. The common ploughman, though generally regarded as the pattern of stupidity and ignorance, is seldom defective in his judgment and discretion.

We deduce from this that the stay of the rural labourer's child at school as long as the child who lives in a town, would be prejudicial to his future career. It may be the case that where a man may have to take the entire oversight and management in all respects of a variety of the elaborate machines now used in agriculture, some small mechanical knowledge may be necessary, but this can be obtained by youths and young men from the cheap books on science now so common, and from the means afforded in night schools.

FARMERS AND THE EDUCATION RATES.

IN the debate on the Education Bill last week, Mr Forster made reference to farmers in connexion with the management of schools in rural districts, in the following terms:—

There are a great many places in the country where the schools are much better off in the hands of voluntary managers than they would be under a reluctant board appointed by the ratepayers. There may be much said against the well-known duality of parson and squire; but I believe that these two will often manage the schools more liberally in the rural districts than they would have been managed by recalcitrant farmers, who are forced to pay the rates. A correspondent of the *Daily News*, dating from East Essex, takes the hon. gentleman to task for the remarks he made. Why, he asks, are farmers recalcitrant in this matter of rate-supported education? Mr Dixon, in his excellent speech, gave the reason, when he said he could understand the opposition to the increase of rates on the part of the farmers, "as he believed they were the men who felt it most. . . . He knew many who said that they did not object to the cost, but they did to the inequality of the rate." That is just the point. Farmers would not object to pay an education rate under a just system of rating, for they would not in most instances pay more than they are already accustomed to subscribe voluntarily. What they do object to is to be compelled to pay twice, thrice, or, perhaps, ten times as much as the gentleman of fortune, the professional man, the rich manufacturer or merchant, or the well-to-do tradesman, who does not happen to be a large occupier of rateable property. They would not object to pay "according to their ability," as the original Poor-rate of the time of Elizabeth specified. It is all very well for Mr Dixon and others to urge them to swallow the injustice of an unfair rating system, and to submit to further imposition for the sake of promoting the education of their labourers. It is surely something to their credit that they should support education at all, seeing that the inevitable result (I trust and hope) will be to raise wages. To ask them further to submit to an unfair and disproportionate extortion for the sake of education, or, in other words, to submit to an oppressive wrong for the sake of doing good, is surely to ask the exercise of an amount of public virtue very unusually manifested by any class of the community, and that no class of men should be asked to exercise to their own injury. Existing rates press with excessive rigour upon farmers as well as upon landowners, and they are constantly increasing. An entirely new rate levied on the old iniquitous basis is too much even for the slow and passive British farmer to endure without becoming "recalcitrant." As to the alleged superiority of management of schools by the parson and squire over that likely to be obtained by school-boards in rural parishes, I think it is by no means generally true. There are few parishes in which there cannot be found a few intelligent men, friends of education. In most village schools the parson is absolute, and the squire does not interfere. It is an autocracy and not a duality of management in perhaps nine parishes out of ten in the country. The parson and churchwardens are frequently the only trustees of endowed or otherwise voluntarily erected and supported schools; and as the parson chooses one churchwarden, he has almost always a majority or two to one in the rare instances in which he is not left to do exactly as he likes. A new school is about to be erected in Kirby, in Essex, partly with money given by Government, of which the vicar and churchwardens are to be the sole trustees. In a neighbouring parish an old unused parish schoolroom has recently been refused to the parishioners who applied to the vicar (who, in this case, appears to be sole trustee) to allow it to be used for the purpose of "Penny Readings" for the benefit and amusement of the people.

GOOD ADVICE TO FARMERS.

THE following is the concluding and excellent advice to farmers, from a veteran agriculturist, Mr Henry Stephens, author of "The Book of the Farm."

"The farmer should provide himself with recreation and instruction at home. Recreation he will find in his own family, in field-sports and manly exercises, and in visits to and from friends at a distance, and neighbours around; for instruction he must have recourse to books, papers, and conversation. If he provide not attractions at home, he will go elsewhere for them, and neglect his farm. It is a common remark among townspeople, that farmers as a class read little. If they knew the habits of farmers as well as I do, this would be no obloquy. Little do townspeople know the fatigue which is endured in early rising and constant exercise in the fields on foot, when even ordinary operations are going on in summer, and especially when improvements are on hand. The lassitude consequent on fatigue which overtakes the framer in the evening is great. It is then physically impossible to betake to reading on a subject that requires thought. The desultory news paper affords the most fitting reading until the hour of bed, which must be early. In winter, it is different, and at that season it is not true that the farmer does not read—for many read much; and as they advance in years, much leisure is given to reading. We have only to peruse the discussions in farmers' clubs to be satisfied that the present race of farmers read and have read to good purpose. Townspeople also believe that the artizans of towns are much more intelligent than the labouring people of the country. There are different kinds of intelligence. I have had many opportunities of conversing with both classes of workpeople, and I like to do it, but never could observe the superior intelligence of the artizan. I am sure scarcely a shopman in any trade knows the countries from whence come the various articles he deals in. A journeyman cabinetmaker knows as little whence the different kinds of ornamental wood come. Is the mason or the joiner, who works by square or rule, a more skilful workman than a ploughman, who guides his horses, and ploughs in a long furrow as straight and as correct as a mathematical line? The country labourer is a keen obobserver of nature; he knows the symptoms of

ather, different kinds of soil, of rocks,
s, the habits of many animals, and the
ties of the plants he cultivates; and as
shepherd, no ordinary artizan is his
or. The manufacturer is favourably
asted with the farmer, since he avails
lf of every improved piece of ma-
y, while the farmer neglects similar
tunities for improving his business.
ases are not analogous. The manu-
er knows with certainty that machinery
aterials which suit a co-manufacturer
uit him also; but the farmer has no
nty of any implement or manure suiting
m climate, soil, situation, and locality,
e has tried it—and it is only once in a
hat he can try it. He prudently waits
proval of others before he adopts it.
ld put the issue between the skill of the
acturer and the farmer in this way:—
British manufacturer is in the most
able position for the prosecution of his
ss, with coal, machinery, conveyance,
a-ports at his service; the British far-
unfavourably situated in regard to soil
imate, which are the means he has to
y. The foreign manufacturer is not
in so favourable a position as a com-
, with the British; the foreign farmer
any advantages as a competitor over
itish farmer. Yet the foreign manufac-
roduces as marketable goods for the
as the British manufacturer; while the
farmer is superior to the foreign far-
a cultivator of the soil, and as a
breeder and rearer of live stock. The truth of the matter is, that the town and country industrial classes are equally intelligent in their respective spheres.

In catering for mental food, the young farmer should take the periodicals connected with the agricultural societies of the kingdom, as well as those in any class of literature which suits his taste. Agricultural chemistry and physiology, animal and vegetable, he should not neglect. His local newspaper he patronizes; and I think that he should have a London agricultural newspaper, on account of the fulness of the reports on markets, domestic and foreign, which they contain. It is a great matter for the farmer, especially the young one, to take a short ramble now and then, in summer, in Continental countries. Travel expands the mind, presents new objects, refines intelligence, corrects prejudices, and adds many materials happiness.

In parting with the young farmer, now no longer a pupil, I would exhort him always to maintain independence of mind and honourable behaviour. He forms the connecting and binding link betweeen the proprietor and labourer of the soil. He thus belongs to that middle class which forms the staple portion of the community. In taking leave of my young friends, I do so in the anxious and heartfelt hope that this my last effort in the cause of agriculture may prove as profitably instructive to their younger successors as the former editions of this work have proved beneficial to themselves.

THE PRESERVATION OF GRAIN IN A VACUUM.

UNDER the head of "Notes from Paris," we find the following interesting description of Dr Louvel's system of preserving corn and other provisions, in *Engineering*:—

The Academy of Sciences expressed approbation at its last *séance* of the system of preserving grain introduced by Dr Louvel. The report of the commission, after having alluded to the importance of the question and the principal solutions it has already received, writes thus on the process of Dr Louvel:—It is known that the most perishable substances can be preserved from putrefaction when they are kept from contact with the air. It is this principle which the inventor has endeavoured to apply industrially.

His apparatus is very simple, and is composed of a cylindrical vessel of sheet iron, closed by two convex covers. This species of portable granary is placed vertically upon supports, at a convenient height, so that the operations of filling and emptying can be conveniently carried on. The upper cover is pierced with three openings; the first is a manhole, by which the corn is introduced, and which can be hermetically closed by means of a rubber packing; the second opening is fitted with an air valve, by which the vacuum is obtained, and the third is closed with a gauge. The bottom of the vessel has only one hole for taking out the grain, and is closed with a suitable stopper. The capacity of the apparatus is about 350 cubic feet. The vacuum is effected by means of a pump worked either by hand or power. A vacuum, equal to 3 inches or 4 inches of mercury, is sufficient to destroy all insect life. M. Louvel estimates that £30 should be the selling price of a granary to hold 350 cubic feet of corn, and £32 the price of the pump, which, with the necessary pipe fittings, &c., would bring the total price to £66. Of course one pump would serve to exhaust any number of vessels. The advantages M. Louvel claims for his system are, that the wheat is placed beyond chance of all spontaneous changes, and that the prompt evaporation of any excess of moisture which it could contain removes all tendency to heating. The corn contained in the vacuum is protected besides from exterior causes of deterioration, from the influence of the atmosphere, from the attacks of insects, in short, from every sort of damage to which it is exposed in ordinary granaries; the *charancon* not only ceases to multiply in the closed chambers, but it dies, and dries up in the course of a few days. The partial vacuum once made, the apparatus requires no further attention nor care, excepting an occasional glance at the gauge, to see if the degree of exhaustion is obtained. Flour, biscuits, or dry vegetables can be preserved in a similar apparatus.

M. Louvel furnishes in support of the assertions which precede the result, the account or an experiment made at the experimental farm at Vincennes, with perfect success. The following is a *resumé* of the experiment:—Three apparatus, of 175 cube feet, each, were charged on the 15th July 1867, the one with wheat of good quality, to which were added 4 gallons of living *charancons;* the second contained damaged biscuit, half destroyed by the insects; and the third a quantity of ordinary flour.

The vacuum made in the three apparatus corresponded to 4 inches of mercury; they were then left exposed to the action of sun, rain, and frost, and they were opened on the 24th January 1868, more than six months after they had been closed. The gauges shewed a vacuum of 15 inches, the great difference being accounted for by the experimenter by the evaporation of the water in the vessels.

The corn shewed no alteration; it was very dry, and still preserved the power of germinating; the *charancons* were all dead and very dry.

The biscuit was in exactly the same condition, as when it was enclosed; but all the insects were completely destroyed. The flour was perfectly preserved.

The Academy considers the process of M. Louvel as applicable with great advantage in the preservation of corn and many other provisions.

PIECE WORK IN AGRICULTURE.

By Mr Chapman Saunders.*

I MUST claim your indulgence in appearing before you this evening to introduce the subject for discussion—viz., "To what extent and with what mutual advantages can piece work be substituted for day work in agriculture?" This subject is not of the ordinary and practical character similar to those with which this club has been accustomed to deal; but it is, at the same time, of a highly interesting nature, since it involves the interest of all classes who are to a greater or less extent connected with the soil—the tenant, the labourer, and also the landlord. Money paid in labour which is necessary to carry on a farm well and profitably, becomes a somewhat important item—in fact, it is scarcely of less consideration than the rent, seeing the money has to be expended for this item when paid wholly in money as in many counties in England, or as in this and some other adjacent districts partly in money and partly in kind. But whichever may be the preferable mode, knowing as I do much which has been written on the condition of the Dorset labourer, and having also had the opportunity, not afforded to all, of visiting other parts of England, I am satisfied that the labourers in this county are as well off generally and as comfortable in their station as elsewhere. The value of labour depends very much like that of everything else, on the law of supply and demand. If the Dorset labourer were, as some would have us believe, in a worse position than those in other parts he would no doubt remove to a distance where he might receive better remuneration, since recent alterations in the law of settlement afford him facilities for shifting. I have known the attempt made—and many of you will substantiate what I say—by men leaving their situations here to receive nominally 5s. or 6s. per week more money in distant places; but after a short time they have been only too glad to return to their former employers.

THE MOST ADVANTAGEOUS METHOD OF EMPLOYING LABOUR.

Labour, as I have said, is one of the most important items in the shape of payment to be made out of the farm; and it is likely still to increase yearly in consequence of the amount of stock kept on the farm being so much greater than in time past, and the occupier being tempted by a higher price to be obtained for mutton and beef than some years ago. This, as a consequence, leads to the production of a greater amount of green food to sustain that stock, and as a result of keeping a larger amount of stock more corn and straw is produced. The labour essential to the carrying out of things in general in accordance with this advancement of agriculture should raise in the minds of most the thought how can all this be best accomplished with mutual advantage to employer and employed—whether day or piece work should be followed. An acquaintance with every operation of the farm is most essential in order to understand what is a fair amount of work to expect for a fair day's pay, and also to attain a fair knowledge of the quality of work of various kinds. In manufactories most of the labour is paid in the shape of piece work from a minute sub-division of labour carried forward under close supervision in a limited area; and of course as the eye and the hand of the mechanic become more and more accustomed to the performance of work of any particular kind with greater ease and despatch the cost in production is more and more reduced until it attains a minimum. That this state of things cannot be fully realized in farming pursuits. I need not remind you, but still in agriculture as in other callings there is a certain method to be acquired by practice. For instance in the simple process of lifting or carrying any substance or body, and also in various other ways of facilitating the various kinds of ordinary work; therefore I say give as much encouragement as you possibly can to ascertain the best method which may be devised of doing what may be required on the farm as well as in the factory at a given time and with despatch. To do this why should not the labourer derive a fair remuneration for his interest and extra exertion? Of course the attendance on stock cannot be carried on entirely in this way, nor the simple tillage of the land, but I believe much may be accomplished which has never been attempted in a general way.

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* Read before the Winfrith Farmers' Club.

A GOOD LABOURER BENEFITED BY PIECE WORK.

Difficulties will arise at the outset in setting up new practices and modes of payment in this manner. Forbearance for a time on the part of employer and also the employed must be exercised. As in other things, the influence of the weather is often brought to bear; and for this reason let me remark that the system of piece work once adopted, the further it becomes extended the better it will be, and the greater the mutual benefit also. Say, for instance, in carting manure by the piece at a price per load. Here you have the men employed in filling, endeavouring to do the greatest amount of work and with the least amount of labour, and the least misapplication of it on their part, using the best tools, &c., for that kind of work, the horses employed being kept in motion and the drivers also; and much more may be done in a given time, especially at a busy season. True, you will say higher wages have to be paid; but what does that matter if the extra money so paid be fairly earned, and perhaps a season saved? If at any hour of the day, when those men are employed filling, should the horses employed by them be advisedly removed conveniently to other kinds of work from any alteration in the weather or other reason, they may then spread the manure over the land, or be sent to do any other work to which there is an understood fixed price attached. Harvesting operations might also be facilitated in this direction beyond their present limits, as the adoption of the reaping machine has somewhat extensively superseded the hook and the scythe, and many of those formerly employed in cutting the wheat may by some plan secure the crops cut by machine at a price per acre—if not the whole at least some portion, as circumstances might more or less favour the operations. If in the morning the weather be unfavourable to harvest work, a few hours, or any uncertain time as it might happen, can be spent in carting and spreading manure over the leys for wheat, which kind of work might be left at any moment for the more important task of harvesting. I consider a good labourer is benefited by the adoption of piece work, and he generally prefers it, whilst a bad labourer becomes a better one from having to exert himself in being obliged to become somewhat more self-dependent.

Mr Saunders then read the following:—

"At a harvest-home celebration on the estates of the Earl of Cowper, a labourer named Digby, in replying to a toast, made the following remarks:—12s. per week was a moderate wage in this part of the country, out of which the labourer had to pay 2s. per week for rent, 2s. for firing, and, supposing he was imprudent enough to be the father of six children, there was just 1s. per week each left for the maintenance of the father, mother, and children. How, then, was it possible for the labourer to obtain animal food, which they were told was so very necessary for the maintenance of the human frame in the early stages of its development? He did not believe the farmers wished to oppress those beneath them, but he would give them this piece of advice—let those young men who had been imprudent enough to get married and have a family do the piece work, as far as practicable, and thus have a chance of earning a few extra shillings to supply their children with animal food to keep their souls and bodies together."

PIECE WORK BENEFITS THE EMPLOYER.

On small occupations it is more difficult and perhaps impossible to carry piece work forward to any extent. The consideration of the degree to which the sub-division of labour can be carried on satisfactorily to employers and employed will prove one argument in favour of comparatively good sized—I should perhaps say large—farms over small ones, as the more each man has one particular kind of work for which he is more fitted allotted him, the more he may be expected to do it, and the better also. On a small farm, with a comparatively small number of hands employed, one person is frequently called on to do many kinds of work during the day, whilst on a large one each may more easily be engaged at one kind of work in the day, and that one only for which he is most fitted. A good attender of stock is not unfrequently very inefficient at ploughing and other simpler kind of work, and *vice versa* we find sometimes men of great strength, accustomed to and qualified for heavy work, do not apply themselves to those kinds of work where brains are of greater service. There is skill in everything. Skill is required in feeding stock, in order to know how to feed and when to feed the animals in charge as circumstances vary; skill in ploughing, and skill in every operation, even in filling a cart; for all these some learning is desirable. It is poor economy to pay too little for any kind of work, but it may be sometimes wrong to pay too much, as it affords a precedent which may prove unsatisfactory afterwards. Some little discretion must, therefore, be exercised, and knowledge is essential in first adopting piece work. Perhaps these are some of the reasons for the non-adoption of the system more generally; but I think you will find where piece work is more the rule the work of the farm is at all times in a fairly forward condition. Again, where labour is scarce—that is, arising from the want of more and better accommodation in the shape of dwellings on the farm; and, I regret to say, there are many such instances yet to be found, although I believe there has been a very decided improvement in this county of late years—there, as I say, the number of labourers being scarce (not from the scarcity of people to work, on the contrary, labourers are abundant), the system will recommend itself for adoption.

EDUCATION ESSENTIAL TO GOOD LABOUR.

Although much of the corn is now reaped by machinery and thrashed by steam power, and naturally less hands are required than when the flail was more generally used, still it remains that more and more labour is required to develop to the full extent the capabilities of the soil, for although the population —according to Mr Mechi in THE FARMER a few weeks back—was, in 1800, 15,000,000, there are now 32,000,000. With this alarming increase the area of the land remains unchanged, and this is another good reason for making that land as productive as possible. Mr Mechi, in the paper referred to, also says, "To keep a man on day work because you don't like to see him earn more money is a narrow-minded and unprofitable mistake." With those sentiments I most fully concur. Plan, arrangement, order, and foresight are essential in carrying out and employing to the best advantage the labour on a farm as well as in a factory or shop. To what extent education will assist or otherwise, I am not prepared to assert, as that will depend on the kind of education which is to be imparted. My opinion is that the education of the labourer should be one fitted to his station, and not beyond it. The thorough knowledge of the "three R's"—reading, writing, and arithmetic—is ample, not forgetting also that such education, whatever it may be, will not be at the expense of the individual but of the public. I do not object to the amount of education I have stated, as in these days more is needed, and I have frequently found an inconvenience from men being unable to read a simple word. Much more remains to be said on the subject of wages and the mode of payment. In conclusion, I will only add that I have had some experience, and possibly may have given the subject of piece work some extra personal attention, extending over several years, but I am perfectly satisfied with the result. In addition to the common practice of hedging, mowing, turnip-hoeing, &c., I cart and spread nearly all the manure on the farm by piece work, store a large quantity of roots for stock, and prepare them ready for the turnip-cutter; and I think it advisable to further extend the system, believing it will tend to my own advantage and not less to the well doing of the labourer.

DANGERS OF AN EARLY SPRING.

VETERAN cultivators are fully warned by premature bursts of spring weather, but beginners in the business are deluded by the pleasures of the passing hour, and make no forecast of the price that may have to be paid for them. An early spring is only too likely to prove the beginning of an unproductive season, and all experience teaches the necessity for guarding, so far as we can, against the worse consequences of precocity in the seasonal movements of the vegetable kingdom. Our duty as cultivators is to obtain from the agreeable conditions that make life pleasant at the present time, a maximum of advantages, and to reduce the inevitable disadvantages to the lowest possible minimum. It will be prudent to push forward the usual spring work in the kitchen garden, with a view to sow and plant earlier than usual. On our cold damp soil, there is next to nothing usually done before March; but we have taken advantage of bright days and a clean tilth to sow many breadths of seeds and plant largely of potatoes. Whatever can be done earlier than usual, even if attended with some small degree of risk, should be done on the speculation of gaining a longer season, for at the best our season of growth is but a short one, and many productions that we prize attain to perfect development only in a peculiarly long and sunny summer.

While, for the most part, an early spring is favourable to the kitchen garden, it is, for the most part, unfavourable to the fruit garden. Severe frost occurring after vegetation has acquired the activities proper to the spring, may do immense damage to vegetables as well as to fruit-trees, but usually the latter suffer most, and often suffer severely, when the former escape with no worse results than a mere check to the progress of development. Wall fruit-trees are now coming into bloom everywhere, and the bloom is plentiful, and there will be a large crop set; but whether the crop will last is another matter. During May and June last year we had a succession of severe frosts that injured the hardiest forest trees, cut down the haulm of the potato, and effected a tremendous thinning of both orchard and wall fruits. Usually the keen frosts that accompany east winds in March effect a terrible thinning of the wall fruits, but more to be dreaded by the cultivator are the cold rains, dripping daily and hourly from a leaden sky, that occasionally visit us when the trees are in flower; for damp is more destructive to pollen than frost, and wet springs are surer forerunners of fruit harvests than springs characterized y winds and keen frosts.

at are we to deduce from these con- tions? Surely that the cultivator should advantage of the time to snatch all he from the sunbeams, but to be very ous that he does not attempt to snatch uch, and prove himself as foolish as the hat snatched at the shadow. The crop will suffer most in case of untoward her is the fruit crop. We cannot pre- the recurrence of frost, but we may do thing to retard the trees, and whatever e done should be done, for one honest work now may make all the difference fter between a wall covered with fruit a wall presenting leaves only, and those ps not of the healthiest. In such a ng season as this, the practice of retard- of the utmost value, and the regret of practical man just now must be that ower to retard is extremely limited. As n affords the quickening power that makes rly spring so dangerous, so the first of the cultivator should be to shade his and prevent the access of the sunbeams m until by his own judgment he is satisfied that they must or may be allowed to enjoy the solar impulse. When artificial methods are employed to screen wall trees from the sun, the roots should be shaded as well as the branches. With loppings of fir-trees above, and rough boards on edge below, much may be done to delay the date of blooming, and every day's delay in such a season as this is a solid gain, for it helps us forward to the season when frosts come to an end, and the crop—if there be a crop—is safe from its most persistent and most powerful destroyer. Where wall trees remain unnailed, it will be well to defer to the latest possible moment nailing them in for the season. Whatever can be done to retard the blooming of fruit trees of all kinds out of doors must be done, and every cultivator must determine for himself the course he will pursue in accordance with the means at his command and the peculiar circumstances of his locality. In a few sheltered and very favourable spots, the trees may be allowed to go ahead for the chance of an extra early out-door crop; but only those who thoroughly understand the local climate can determine as to the propriety of the procedure.

HE GAME-LAWS FROM A LANDLORD'S POINT OF VIEW.

CORRESPONDENT of the *Banffshire Journal*, who signs himself "Altera " makes the following remarks on the -laws:—

t us suppose it decreed by Act of Parlia- that ground game should be killed , and that constant precautions should ken to prevent its ever again existing in ppreciable quantity. The only question d then be how to obtain this result.

frequently proposed method of destroy- he ground game is to give each tenant ission to kill it on his own farm.

e object of the following remarks is to out that this remedy is alike detrimen- o the interest of landlords, tenants, and ountry at large.

The first reason I would submit in support of my proposition is one which most candid people with sufficiently wide experience will readily admit. It is that no remedy which would be available to tenants is capable of effecting the purpose designed. In nearly all cases where ground game is complained of, there exist woods as well as fields, and it is from the woods that hares and rabbits make their incursions. Under such circumstances, neither shooting, driving with dogs, nor snaring at the edges of the fields, will keep down any considerable quantity of ground game. Rabbits, as we all know, do not, as a rule, make their holes nor breed in the fields, and hares spend at least half their lives in the woods, to which they w assuredly take on being alarmed. The only way of really keeping down ground game is for the landlord to employ, regularly and steadily, a number of trappers, proportioned to the extent of the ground.

My second reason is not a pleasant one to allude to in an agricultural community, but as the object of this letter is truth and not compliment, here it is: It belongs, unfortunately, to the domain of experience that some of those farmers and their servants who have permission to shoot rabbits do not find it much trouble their consciences to shoot hares and winged game also.

The above remark refers to those tenants who view their obligations in an easy way. Here is one which would apply to the most scrupulous: In their perpetual and useless perambulations through turnips and stubbles, they would frighten the partridges so continually that the owner of the land would have small chance of being able to approach them; that the birds would leave the country, or die out for want of rest; and that a sport, absolutely harmless to farmers, and constituting one of the principal charms of country life in autumn, would be lost to the upper classes of this kingdom.

Do farmers suppose that, if all game were either absolutely or by the measure in opposition to which I am writing, practically abolished, rents would remain the same?

Are increased rents and an idling tenantry likely to cheapen that article, the name of which is so frequently taken in vain—I mean "the food of the people?" Is it by paying a higher rent that farmers will sell corn cheaper, and compensate the poor of our large towns for the loss of rabbits, which form their favourite, and, in the great majority of cases, their only animal food?

The next point I desire to speak of concerns landlords. Perhaps, even in these days, a word may be timidly spoken in favour of that oppressed class.

If tenants are to have, practically, equal sporting rights with their landlords, the leading attraction to sportsmen of a sojourn in the country is annihilated. For, independently of the general reasons above adduced, every proprietor who takes out his friends for a day's shooting will probably find that the turnip fields he has endeavoured carefully to reserve for the occasion have been beaten half-an-hour before. Also, hearing, ubiquitous, shooting gamekeepers will never know whether it be legitimate or not, and will be unable to do their duty.

Although this is a question of profit with many, some of the younger men among the tenantry of Scotland do not admit frankly their true motive for agitation—namely, that they may become sportsmen themselves. To this I must reply nearly in the words of Prince Henry—

> Two stars keep not their motion in one sphere;
> Nor can one *landlord* brook a double reign.

What, after the industry, enterprise, and prudence of her people, are the chief sources of Scotland's prosperity? What brings yearly large accessions of wealth to her people? Is her climate balmy? Are her towns rich in operas, concerts, picture galleries, and the manifold attractions of Continental cities? Or are the sources two, and two only—namely the immense benefit to mind and body which thousands derive from sport in her healthy and bracing air, and the existence, in certain limited regions of her surface, of beautiful scenery? The inhabitants of the north-eastern corner of our island are a patriotic race, and justly proud of the district where they were born and bred; but surely these, the best satisfied with their native land, do not imagine that any one is attracted to it by its romantic natural beauties, and must acknowledge that the other motive I have pointed out is the chief inducement to visit this portion of our island.

The tradesmen and hotel-keepers of Scotland have little idea of the disastrous loss which the total or practical abolition of the Game-laws could not fail to bring upon them, and did they look forward but a very little way, they would be the first to support the most moderate and just of the landlords in a wiser measure.

If the ground game question be incapable of pacific compromise between reasonable men, which I do not for one moment believe, or if, as is probable, the matter has gone too far for compromise, the remedy is the following:—

Let all existing leases be remodelled, at rents compensating the landlords for their loss, and then let the tenants have redress of the most summary description for any and all damage by ground game.

I have thus endeavoured to shew why it were well to pause before introducing the measure of giving up the ground game to the tenants.

The Farm.

AGRICULTURAL RETURNS, 1871.

MR FONBLANQUE'S admirable compendium of the Agricultural Returns of Great Britain for 1871, has just been issued. They might have been published earlier, but for the obstacles thrown in the way of the collecting officers by "the refusal of a minority of the farmers to answer a few simple questions, notwithstanding, in many cases, repeated personal applications." It is scarcely believable that farmers at the present day should be so perverse as to keep back information of the character asked, as it is valuable to all without being injurious to any.

There are many specially interesting particulars in the tabular returns, which we shall take up again. This week we must content ourselves with summarizing Mr Fonblanque's introduction.

The number of returns received in 1871 exceeded those of the previous year by about 20,500, the total numbers being 549,784, as against 529,150 in 1870. The increase is due in part to occupiers who have more than one farm making separate returns, and to a stricter collection of schedules from small holders. Of the returns received during last year 281,920, or 51 per cent., were from occupiers of less than 20 acres of land. In England, 51 per cent. of the holdings were under 20 acres; in Wales, 46 per cent.; and in Scotland, 55 per cent.

Mr Fonblanque goes on to say:—

The total acreage returned for holdings under 20 acres was 1,897,984 acres for Great Britain, or 6 per cent. of the acreage returned for holdings of all sizes. Of the 1,897,984 acres, 830,223 acres, or 44 per cent., were under tillage, and 1,067,761 acres, or 56 per cent., were under permanent pasture. The live stock returned as belonging to occupiers of less than 20 acres, consisted of 109,029 horses out of a total of ,254,450; of 582,555 cows and cattle out of a total of 327,750; of 1,414,041 sheep and lambs out of a total of 27,119,569; and of 502,789 pigs out of a total of 2,499,602.

It will be interesting to see, so far as relates to the particulars just described, to what extent the smaller and larger classes of holdings differ in their agricultural condition and resources. Thus, of the total acreage returned by the two classes of holdings in Great Britain, holdings under 20 acres had 44 per cent. of the acreage under tillage, and 56 per cent. under permanent pasture; and holdings of and above 20 acres had 61 per cent. under tillage, and 39 per cent. under permanent pasture. As regards live stock, the proportionate numbers to every 100 acres were—Horses, 5.7 on holdings under 20 acres, and 4 on holdings of and above 20 acres; cows and cattle, 30.7 on holdings under 20 acres, and 16.4 on holdings of and above 20 acres; sheep and lambs, 74.5 on holdings under 20 acres, and 88.8 on holdings of and above 20 acres; lastly, pigs, 26.5 on holdings under 20 acres, and 6.9 on holdings of and above 20 acres. The difference in the number of sheep upon the two classes of holdings in Great Britain is affected by sheep being rather numerous in the small holdings in the hilly parts of Great Britain or in Wales and Scotland. In England, the proportions for sheep per 100 acres are, upon holdings under 20 acres, 32.7, and upon holdings above 20 acres 76.5.

The total acreage returned as under all kinds of crops, bare fallow, and grass in the United Kingdom, in 1871, was 46,667,178 acres, against 46,177,370 in 1870; of the additional 489,808 acres in 1871, 430,988 acres appear in the returns for Great Britain, and 58,820 acres in the returns for Ireland. Taking the population as ascertained by the last census in April 1871, and the total acreage returned as under crops, bare fallow, and grass in 1871, it would appear that the quantity of land under cultivation per head of the population was about 1.2 acres in Great Britain and 2.9 acres in Ireland. It is probable, however, that a larger proportion of poor herbage is included under the heading of "Permanent Pasture" in Ireland than in Great Britain. According to the returns of 1871, which shew a total acreage under cultivation of 30,838,567 acres in Great Britain, and 15,711,398 acres in Ireland, the quantity of land devoted to the different kinds of cultivation was—for corn, 9,675,261 acres, or 31.4 per cent. in Great Britain, and 2,124,079 acres, or 13.6 per cent. in Ireland; for green crops (including potatoes) 3,738,180 acres, or

12.1 per cent. in Great Britain, and 1,511,532 acres, or 9.6 per cent. in Ireland; for bare fallow, 542,840 acres, or 1.8 per cent. in Great Britain, and 22,323 acres, 0.1 per cent. in Ireland; for clover and grasses under a rotation, 4,369,448 acres, or 14.2 per cent. in Great Britain, and 1,827,733 or 11.6 per cent. in Ireland; and for permanent pasture, 12,435,442 acres, or 40.3 per cent. in Great Britain, and 10,068,848, or 64.1 per cent. in Ireland.

FARMING IN EAST LOTHIAN.

NO. XII.—POTATO CULTURE.

SOME forty or fifty years ago, if any one had predicted the possibility of 9000 acres of potatoes being grown in East Lothian, every year, the seer would have looked upon as simply insane. The most skilful and practical farmers would have condemned the prophecy, for two plain and substantial reasons, viz., where was the manure to come from with which they were to be grown; and, even were that difficulty overcome, how were the tubers to be marketed and consumed? The genius of George Stephenson has opened up to us the great markets of the south, and the large importations of guano, combined with the impetus thereby given to the manufacture of artificial manures, has supplied the means for the successful culture of potatoes. The increase of the potato trade is one of the principal causes of the rise in the value of land in this county; in fact the present rents could not be paid without them. Some proprietors are adding stringent clauses in their leases to restrict or limit their growth. It may be doubted whether they act prudently in this, as there can be no question that potatoes are a considerable help to the payment of rent, for which there is no substitute, and they cannot be profitably grown unless the land is very highly farmed. A tenant would ruin himself, and still be improving his farm, were he attempting to grow more potatoes than he could properly manure. On every farm where there is a large acreage and first-class crops of potatoes grown, depend upon it, the man who farms that land must be unusually kind to it, and is just the sort of farmer we should like to succeed. The power of doing ample justice to the "potato brake" is no mean test both of the purse and the manurial resources of the farm; besides, common sense teaches farmers to limit its extent to the means at their command. Every practical farmer knows that 1 acre properly manured will yield more than 3 which have only been partially so. A field which has been thoroughly manured for potatoes during one rotation, does not forget it for the next. We could instance a field on one of the most highly cultivated farms in our parish. It is the only one on that farm which has not undergone a thorough dressing of manure for potatoes—and it is at this moment in the worst condition.

Potatoes can be grown year after year on the same land if sufficient manure is applied—the small cottage gardens of our working men prove this. The largest crop of potatoes we saw last season was grown on a field which also grew the largest crop we saw in crop 1869; the intermediate crop was wheat, which yielded more than 50 bushels per acre; on the same farm after potatoes another field reached very nearly 60. We give these statistics to shew that potatoes by no means exhaust the land to the extent many people suppose, simply because the extra manure they require is much more than they take away.

Potatoes are also of great value for feeding cattle. The experience of 1868, a year in which we had almost a total failure of the turnip crop, and owing to the very hot weather a most extraordinary second growth of potatoes, which rendered a great proportion of the crop unfit for sale, proved this. Farmers were compelled to feed their cattle entirely on potatoes and cake, and better fed animals never left the county. If we could foretell the character of our summers, many farmers would grow a coarse variety of potatoes, and a field or so of beans, in preference to turnips, for feeding purposes. The turnip crop in East Lothian of late years, with the exception of last, has been very bad.

On all the farms in East Lothian, where a large breadth of potatoes is planted, almost if not the whole of the farm-yard manure is applied to them. We alluded to the proportion of land on a 300-acre farm in grain crops to be about 140 acres; or, to go exactly according to the stipulations of most leases, 150 acres might be in crop. An average crop of straw, estimating the weight from every variety of grain, may be estimated at 220 stone per acre.

The variations of different seasons are very great. When we come to write on the wheat crop, we shall give the quantities of grain and weights per acre of straw of different seasons, which will shew how difficult it is for a farmer to estimate the quantity of manure he may be able to manufacture on his farm during any one season. A great help, now-a-days, is obtained from the system of feeding cattle during summer on cut grass and vetches, and cake in the cattle courts—a large and profitable addition is made to the manure heaps. The cutting of the hedgerows "green," and ditches, and mixing the yard manure with potato stems, all assist to swell the heaps, besides adding green vegetable matter which is of much value in assisting the proper fermentation of manure.

We alluded in a previous article to the matters which were referred to arbitration between the out-going and in-coming tenants: a frequent one is straw, which the out-going tenant cannot sell, and has not been able to make into manure, or he may leave it at the wish of the new tenant. An allowance is usually made at the rate of 3 square yards dung for every 100 stones of straw (22 lb. to the stone). We may explain that all the farm-yard manure is valued to the new tenant after it has been laid up in heaps for a certain number of days, when it is measured over and *valued* by the square yard. We mentioned a-sixth as an equal and possibly most profitable proportion of a farm to crop every year with potatoes. If cattle are fed in the courts during summer, and every possible means used to make manure out of the weeds of the farm, there should be at least 25 tons per acre of manure for the whole (brake) We consider 25 tons of well-made manure, applied either in the drill or stubble, the minimum quantity of farm-yard manure to grow a good crop, and besides this we usually apply from £4, 10s. to £6 per acre in artificial manures. The best mixture with farm yard manure, we think, is 5 cwt. of the best ammoniacal guano. Chincha Island was by far the best; now we think Ichaboe. The best mixture, in our experience, is 4 cwt. Ichaboe guano, 2 cwt. bone meal, 2 cwt. rape dust, 2 cwt. coprolite superphosphate 1 cwt. muriate of potash—11 cwt. per acre, in addition to the dung.

Many experiments have been tried to test the comparative value of autumn manuring the stubbles against spring manuring in the drill. We have tried both, and give our opinion *from experience* in favour of the drill manuring. But it is impossible to leave all the work till spring, and it is necessary to manure at least one-half of the ground in autumn. This is done from the summer made manure, which is always best. We have no doubt it is owing to the superior quality of the manure. So many farmers declare in favour of stubble manuring the land. There is another point on which many of our best farmers differ, viz., on the advantage of putting all the manure, whether it is to be applied on the stubble or in the drill, into large heaps, and then turning them over, before they are applied to the land. Many farmers apply the manure on the stubble, and sometimes even the drill, direct from the cattle carts. Our opinion, confirmed by repeated experiments is, that it is most profitable, even although it entails a good deal more expense, to what is called "midden it, and turn it over" before it is used.

XIII.—THE CULTIVATION OF POTATOES.

Having stated the quantities of manure, we now come to deal with the mode of application. Immediately after harvest, the land intended to be dunged on the stubble is marked off into ridges 18 feet wide. The manure is then laid into small heaps at regular intervals — the quantity per acre being regulated by the number of heaps pulled from each cart-load. A straw rope is frequently tied on a spoke of the wheel, to mark each revolution when a heap is drawn out, and the quantity applied per acre will of course depend on the size of the heaps; five from each cart-load is a liberal allowance. We always employ the same man for laying down manure. He gets thoroughly into the work, and is able from long practice to measure the size of each heap. It is an essential point in manuring stubble, to get it spread as soon as possible. It is a great mistake to delay the spreading, in order to let the ploughs follow close behind. It is a curious fact, but nevertheless true, that properly made manure may lie scattered over the surface for weeks, and it will act equally as well as if it had been ploughed in reeking from the carts.

If the stubble clean after having been manured and *well ploughed*, nothing more is required than a double turn of the harrows to level the surface, before planting the potatoes.

The land is drawn off into drills, generally 28 inches wide, the drills being made across the original or first furrow. The artificial manure is then sown, either by the hand or from a machine, which sows three drills at a time. We prefer the machine, because it saves expense and sows the artificial manure better. Planters then follow; the potato setts being laid at the bottom of the drills at regular intervals. Some farmers plant potatoes at 10 inches apart, others at 12. We like them wider still, about 14 or 15 inches.

There is great difference in opinion regarding the cutting of seed potatoes. A very successful grower told us lately that he always planted cut setts from large potatoes. We were advocating the planting of small potatoes whole. In dressing over potatoes for seed, we cut the larger sized ones in two, and those about 1¼ inches in diameter, we plant whole. We cover in the potatoes with a good deep furrow. After a few weeks, we harrow down the drills, giving them sometimes a double turn across, which effectually, and at small expense, checks all weeds. After the potatoes are sufficiently through the ground, we give them a deep and thorough hand hoeing. This is followed by a single horse grubber. After a time the potatoes are again hand-picked or hoed, and grubbed this time with a two-horse grubber *as deep as possible*, followed by a single horse grubber, which fills up the foot-prints made when two horses are used. Nothing benefits potatoes more than having this operation properly done. Potatoes may be manured to any extent, but unless the land is perfectly worked, or what we term *tidded*, *i.e.*, managed, the manure is to a great extent thrown away. The deep cultivation betwixt the drills gives sufficient loose mould for earthing up, which is the last process of all as far as man's art can go in growing potatoes. Before earthing up it is a good plan to apply 3 cwt. per acre of artificial manure sown broadcast. If possible, choose a dampish day for earthing up to lay as much moisture as possible to the roots.

When potatoes are manured in the drill, four women follow the cart, one of them follows immediately behind the man who lays the manure in heaps, and puts an equal portion into the drills on either side. In each of these drills there is a spreader, and behind the spreaders there are four planters who have the seed potatoes handed from a cart. Too much care cannot be taken to see that the manure is equally distributed, and the potato setts planted at equal distances from each other. The artificial manure is sown first, immediately behind the ploughs which keep drawing off and covering in, so that all the potatoes which are planted are covered over when the people leave off work. In preparing the seed for planting, it is of graet importance to have a sufficient number of outworkers so as to cut the seed and plant immediately. Many a crop has been much injured, if not totally destroyed, from cut setts being allowed to lie weeks before being used. If possible it should not be allowed to lie more than a single day. It is a great argument in favour of using smallish sized whole potatoes, the difficulty in obtaining a sufficient number of hands, both to cut and plant at the same time, especially when the weather is uncertain. Last April, for example, we were stopped planting for three weeks from wet weather; some farmers continued to cut seed, which lay long, the consequences of which were most apparent in the fields where it was used. Farmers may have been taught by this the advantage of wide planting, as many fields which looked blanky at the time of earthing up, yielded a very good return when they came to be lifted.

The time for lifting potatoes depends much on the nature of the season and the variety of potatoes. The month of October is the usual time for lifting Regents for pitting. But we may say the potato harvest in East Lothian begins about the middle of July, when an early kind called Dalmahoys are lifted and sent in baskets, mostly to Newcastle. After they are finished, early planted Regents supply their place or another variety called Red-bogs. In our experience we have found the Regent the best. They were brought from Dumfriesshire, having been grown there by a gentleman who imported them from South America. There is another variety which is highly esteemed as an early potato, viz., Rintoul's Early White Don, also a very finely flavoured potato known as Rintoul's Stripped Don. This potato is a hybrid from the old ticked Don and Dalmahoy. These are, comparatively speaking, new varieties. But there are newer still—a very handsomely shaped potato and a large cropper, called the Victoria, is held in much esteem.

Your non-agricultural readers must understand that there is what may be termed modern fashion in farming, as there is in everything else. New varieties of potatoes are introduced every year, and every opportunity is afforded of having their merits tested. After a little experience we find many of these so-called new kinds to be closely allied to the old ones, and the potatoes in most repute in East Lothian are Dalmahoys and Red-bogs of the early varieties, and Regents and Rocks of the late ones.

It is the usual practice in East Lothian to lift potatoes with a plough made for the purpose, with a peculiarly-shaped fan attached to it, which scatters the potatoes on the surface. Before being ploughed, the stems require to be cut and carted off. A potato-digger has also been introduced, which appears to work very well; but dealers assert that it causes the potatoes to be black-ended. They are certainly knocked about a good deal. We think the most profitable system of lifting potatoes is to dig with the hand. Men skilled in the use of the grape can dig over 3 tons per day. Four men can easily lift 1 acre per day. Two women go behind each grape, one to shake the stems, the other to pick up the roots, leaving all the very small sized potatoes on the ground. These are picked up by a small boy or girl. The expense of each grape per day is about 7s., that is, 3s. per day for the man; two women at 1s. 6d. each, 3s.; and the small boy or girl, 1s. The work is thoroughly well done, and the potatoes are all pitted ready dressed for delivery.

It is a very tedious process dressing over potatoes in winter, especially in such a wet season as this, besides the comparatively small amount of work you can get done during these short winter days. Another argument in favour of the grape against the plough is the perfect manner of the one compared with the other. It is difficult to get the plough thoroughly under the potatoes, and after a field which has been lifted with the plough has been grubbed and harrowed you will often see 2 bolls per acre at least on the surface. A frosty night may come and in fact invariably does come about the latter end of October or beginning of November. Injury is done although the temperature hardly touches the freezing point. But this is comparatively a small loss, and one which can be avoided, but our potatoes in East Lothian suffer frequently from frost in spring. We remember one occasion, in May 1869, all the early planted fields were carefully cut down. We know nothing in our agricultural experience, "unless it is a tremendously high grain-shaking wind in harvest," more disheartening than these blasting, blackening and damaging hoar-frosts of spring, which so often injure our potato crops. We call them blackening, because although the stems are white enough in early morning, they soon become blackened after sunrise. It has been remarked how some potatoes recover the injury done by these frosts. This, so far true, we have seen a very large crop in a field which had been completely cut over. But this field had been very highly manured, and we have no doubt the crops would have been some weeks earlier, and even larger, had no frost occurred. The latest and most damaging frost we ever had was on the 6th of July 1863, if we recollect right. All flat low-lying fields, especially on the margin of rivers or small streams, which appeared luxuriant the day before, were in one night completely withered, and shewed nothing but blackened stumps. The injury done was immense, the crops being the worst we remember.

It is found to be the best plan to store potatoes in pits, 3 or 4 feet wide at the bottom, drawing gradually to an apex. This must be done with great taste and accuracy, the bottom and sides should first form an isosceles triangle. Wheat straw is then placed perpendicularly along the sides of the pit, about 6 inches thick, and a covering of earth up to within 1 foot of the top of the pit. They lie thus for perhaps a month or six weeks, and are then thoroughly covered with earth over the top to protect them from frost. Some farmers, and even dealers, do not put earth over the top. We have seen damage where this has not been done, and it is safer to do it; but it all depends on the time the potatoes are intended to lie. During long severe frosts, accompanied with cold sharp winds, we have had occasion to cover the pits with stable manure. In pitting potatoes, care should always be taken to place the pits so that both sides may have equal share of sunshine. They should also be laid where there is easy access to a turnpike road. Should we have a continuance of wet seasons like the present, we will get temporary light portable sheds, of 60 feet in length, or so, for covering both the potato pits and people when at work, so much time has been lost from wet weather this season.

A very great proportion of the potatoes grown in East Lothian are sold per acre to dealers, who pit them entirely at their own expense—farmers supplying only the horse labour. Some of these potato merchants carry on a very large trade. The purchases of one dealer last autumn exceeded £30,000. These potato traders mostly reside in Dunbar, and carry on a very large business both with the farmers of East Lothian, West Lothian, and Mid Lothian, and Berwickshire. There is a great deal of speculation in the trade, and these merchants all meet their engagements with the greatest punctuality, and frequently incur serious loss from the fluctuation in prices. They are all capital judges of both the quality and crops on the different farms. East Lothian potatoes command the highest prices in the London market. Especially Dunbar red soils, so-called from the peculiar tinge given to the roots from the soil on which they are grown. Grey soils stand next, but are sold at 10s. per ton below the others. There are a number of potatoes also sold by auction, and some farmers pit their potatoes and sell them by the boll, either to dealers or truck them to agents in London, but the best potatoes are sold to dealers by the acre. The highest price we heard given last season was £50 for a field near Dunbar, from £20 to £30 may be quoted as the current prices. We have found it of great advantage to change the seed at least every second year. Potatoes should always be brought from a poorer, colder, or later climate to a better. We get our best seed from Lanarkshire and Perthshire. Seed is now sent from Scotland to England, the English farmers having been convinced of the benefit of the change.

Much has been written upon, and many remedies proposed for the potato disease. East Lothian suffers less in this respect than any other county, simply because the land is well drained, and there is less rainfall than elsewhere. The disease is caused entirely by the nature of the weather during the end of July and August. If we have then a continuation of wet days, accompanied with hot misty evenings, disease is certain to occur. Sharp cold drying winds alone can prevent it. Some of our farmers look upon the disease more as a friend than an enemy, seeing we are comparatively exempt from its ravages. We omitted to mention that the quantity of seed required to plant an acre is about half-a-ton. We have no more to add, but merely to mention that a good or bad year for potatoes implies either a profitable or unprofitable balance sheet in the East Lothian farmer's ledger for the year.

NO. XIV.—THE CULTIVATION OF WHEAT.

After potatoes, wheat is generally sown, but on some of the earlier lifted fields, on comparatively light soils, barley is substituted for wheat. The high price of barley during late years, and the tendency of wheat on these lands to throw out, *i.e.*, to die away in spring, is the cause of this. But we believe thoroughly in the variation of crops, and do not think it prudent on any land to repeat the same white crop twice during a rotation. The effects of the variation of crops on the soil is one of the mysteries which puzzle agriculturists.

The extent of land under wheat in East Lothian is annually about 13,000 acres being 1000 acres less than the acreage of barley. The best wheat crops are grown after potatoes. Formerly bean-land wheat was considered the best; but the fashion in this respect has changed, comparatively few beans are grown, and all the best land is used for potatoes. Thirty years ago, a great proportion of our fields were bare fallow. This was absolutely necessary on account of the want of manure to grow either turnips or beans, and in order to afford opportunity for cleaning the land. Our fields were badly drained in those days, and the ridges were what is termed in agricultural parlance, "gathered up," being ploughed high in the middle, leaving a wide and deep furrow betwixt each ridge. Without exaggeration, we should say there were 2 feet of lost ground on each ridge. Our modern reaping machines would be of no use on these fields.

We are led to reflect on the changes which have taken place. We wonder how it was possible in those days to raise sufficient produce to pay the rent. Farmers not only did so, but were able to lay by money, which very few can do now. There was great economy in agriculture in those days, and the expenses were scarcely a fraction of those of the present time. Now-a-days, although the produce of many farms is nearly trebled, the money is all expended in paying much higher rents, and in *annually* increasing manure bills and farm accounts of all kinds.

In preparing the land for wheat after potatoes, our usual practice is to harrow and grub it, pick off any couch grass or potato stems, and then we plough it all over and let it lie to catch a favourable day for sowing. We never sow wheat till about the third week of October, and it may be sown with favourable weather on till March, but every endeavour should be made to get it all in before January. Last season has been the worst on record, and a great deal of our wheat has not only been sown very late, but with the land in bad condition. Some farmers did not plough their potato land this season, and sowed the wheat after the grubber. It does very well, but where there are many thistles it rather encourages their growth, and is, on the whole, rather a slovenly style of farming, but in land suited for it may be successfully practised. Nine-tenths of the wheat sown in East Lothian last autumn has been put in broadcast. If the land is clean, it is perhaps a better plan than using the drill. Broadcast-sown wheat is distributed all over the ground, and each plant has more room all round to tiller out than drilled wheat, which is confined in rows.

reference to the comparative advantages ill-sowing *versus* broadcast, we prefer lcast for some stiffish soils, clear of wild r annual weeds; but for all free working of lightish or medium quality the drill st—the crop is much more certain. A good plan, and one adopted from and, is to use a press wheel behind the h, the grain is sown broadcast, but s in distinct drills and can be hand-hoed ame as drilled grain. Besides the advan- of this, the press wheel acts as a roller, ng the ground much firmer—a great ntage for a seed bed on light land. In a autumn, farmers would find it advanta- s to roll over the whole of their wheat, *i.e.*, her permitting. The cause of a great deal heat grown on lightish land dying out in g is from the ground not being firm gh during winter. From the want of ression the rootlets never get a firm hold. s been argued that a rough surface is rable for sheltering the wheat plant in r and during the biting blasts of spring, we hold to be a mere antiquated fallacy, is no plant so hardy as wheat; and admitting the shelter afforded by these let any keen observer experiment on a on of his wheat, and autumn roll a few and watch the rapidity with which the t on the smooth surface tillers out and rs the ground in comparison with the h and spring rolled portion. Of course system can only be adopted on soils ble for it, and in seasons the very reverse st.

heat sown after beans is generally drilled. e is more time for working the land, the being mostly cleared by the middle of mber. Bean land wheat generally s more straw than potato land, but both uality of grain and straw is better after oes. We have noticed a greater ten- y to mildew in wheat after beans, and traw never has the same golden tinge o wheat straw has. There is no fallow t grown in East Lothian now—at least should not be any. Long ago when ystem was in vogue, it used to be sown in August, and grew large quantities of straw, and sometimes very little grain in proportion.

Nearly all autumn sown wheat will be benefited by the application of something to give a rapid braird, and on soft lands, or soils which have a tendency to grow too much straw, something to stiffen it. A crop which apparently, as far as the judgment of the eye can reach, is quite equal to or even looks superior to another on a different farm, may vary less or more from 6 to 8 or even 10 bushels per acre. Experienced arbiters are well aware of this, and never now-a-days attempt to value a crop by its appearance on the ground. We make these remarks to shew the value of the different mixtures of manures for top-dressing. Few farmers are aware of the value of common salt. We have no doubt, very many of them use it, but unknown to themselves, and purchase it at 8s. or 10s. per cwt. under the form of a mixture, when it can be had for 1s. 3d.

We were first convinced of the value of salt from some experiments made sixteen years ago. The crop was wheat after turnips. The top-dressings applied were as follow—"but we need not give the whole series," merely mention 1 acre was top-dressed with 2 cwt. of sulphate of ammonia. Another acre with 2 cwt. of sulphate of ammonia, and 1 cwt. of common salt. It happened to be rather a wet summer, and the straw was bulky and very much laid. But the experiment in which salt was introduced shewed a decided superiority. There were nearly 3 bushels more grain and 40 stones more straw. Judging from the eye, the plots where no salt was applied appeared to shew the most straw, from being laid. In the plot where salt was introduced, the straw was much stiffer. We recommend a mixture of manures for autumn wheat, viz., ammonia, phosphates, potash, and salt—the proportion of each to be regulated by the nature of the soil. 1 ton sulphate of ammonia, 2 tons coprolite superphosphate, 1 ton potash, 1 ton common salt, 1 ton fine bonemeal. This mixture will cost about 8s. per cwt. It is a very good compound to apply to the wheat in autumn. 5 cwt. per acre would only cost £2, and it would yield a large increase both in straw and grain, especially on land not over-rich. The great mistake in top-dressing proceeds from using manures too highly ammoniacal, which causes the grain to fall down under the first summer showers. The manures used in top-dressing should be very nearly the same, as those applied to the green crops. Much money is thrown away from the use of both nitrate of soda and sulphate of ammonia. As a top-dressing in spring we admit their efficacy if the weather is favourable; but in a dry pring, under scorching suns and cold biting east winds we have seen no good results there they were applied, and besides this they have no effect next crop. We have had occasion to remark this in making some rotation experiments, to which reference will be made when we come to write on the turnip crop. The period when wheat ripens in East Lothian varies of course according to the nature of the summer. The greater portion of our wheat is generally cut in August. Some of the earlier varieties of oats and barley are cut first, but all our cereal crops ripen within ten days of each other. When we come to mention the varieties generally grown in East Lothian, we can touch on their various ripening qualities; also the quantity of seed sown per acre, which depends entirely on the variety of wheat and condition of the land.

EXPERIMENTAL AGRICULTURE AT CIRENCESTER.

By Professor WRIGHTSON.*

IT is two years since you have heard the report of the proceedings of the Experimental Committee. No small amount of work has been expended upon this department of the Chamber. These experiments have involved an immense amount of work upon the part of those gentlemen who kindly co-operated with us in conducting the series. The amount of work which has been done may perhaps have warranted us in expecting large results; and I think we have learnt one thing at least from the experiments, and that is the extreme difficulty of conducting agricultural experiments at all. We have, I think you will agree with me, fallen upon rather unfortunate seasons, not that we ought to blame the seasons for everything, but at the same time when we began our experiments in 1868 upon roots, we were rather balked by a dry season. In 1869, I laid before you a report which really did contain a great deal of interesting matter, and we came to some conclusions with regard to wheat, barley, and swede cultivation. In 1870, we for a second time came upon an unfortunate season, so that we again felt ourselves a little balked. For 1872, I have something to shew you; a great deal of pains has been taken, and I think you will find that we can generalize a little—that is to say, we have obtained some definite results.

THE EFFECTS OF NITRATE OF SODA UPON CEREALS.

Now, before I begin to speak of the swede experiments in 1871, I have just a few words to say upon the experiments of 1870 upon cereals. These results were very much modified by the drought. But I think the report of those results may yet be of use. In the last report of the experimental committee there was a little compendious table which obtained a considerable amount of circulation; and perhaps was one of the most useful portions of our undertaking in 1869. It referred to the amount of produce in wheat where we applied nitrate of soda, and the form of the table was this, the produce in lbs. of wheat for every 100 lb. of nitrate of soda applied. The result in twelve plots

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* Read before the Cirencester Chamber of Agriculture.

increase of 234 lb. for every 100 lb.
ate used. That is to say, every 100 lb.
considerably more than double its
t in wheat, and that was where 1½ cwt.
sed per acre. With the double dressing,
100 lb. produced 257 lb. of wheat, or
. of wheat for every 1 lb. of nitrate of
applied. Now, we enter upon the
s of 1871. I am able to present you
this: that, where this application of
e of soda was used, for every 100 lb. of
e we obtained 208 lb. of wheat upon
ots, that gives about an average of 2 lb.
eat for every 1 lb. of nitrate, with 1½
er acre. Then the double dressing or
. per acre produced 203 lb. of wheat, so
he season of 1871 gives a less result, but
lt not altogether discordant with 1870.

DE DRILLING OF WHEAT AND BARLEY.

en we next enter upon another subject,
hat is the wide drilling of wheat and
in 1869. The result of wide drilling
eat and barley was to a certain extent
dant, that is to say, sometimes better
sometimes worse than the ordinary
d. In Mr Smith's, of Bibury, results
tained a decided advantage by drilling
that was upon land in fine condition.
nderson also, on behalf of Lord Bathurst,
took similar experiments, which almost
the harvest seemed to promise a more
lant crop than the ordinary drilled
, but it became mildewed, though the
was heavier, the grain was less in yield
he ordinary crops. Our results in wide-
g wheat were not such as to induce us
er our system of drilling wheat to any
extent, but I think it may teach us that
may be drilled much wider without
reat sacrifice, and there may be times
it may be desirable to sow wide, say on
and, in order that we may practise a
r amount of interculture. The barley
s were more encouraging than the
. I obtained a distinctly larger
in several plots of barley which were
rilled in 1868. Mr Iles, in 1869, ob-
. encouraging results. The wide-drilled barley (16 inches) really did in many cases give a better yield than the ordinary crop. The same experiments were repeated by me in 1870. I had six plots which were drilled 16 inches at the rate of 1¼ bushels per acre, and the yield was 30½ bushels per acre against 33 at the usual width. So that with a less quantity of seed, I obtained 30½ instead of 33½. Then we tried another plan, in which alternate rows 16 and 8 inches apart with 2 bushels of seed to the acre were used, and again I obtained 30½ bushels. So that you saved in the seed but lost in the crop. But circumstances might arise in which it would be advisable to drill wide, and from the results of these experiments we need not fear to do so. Mr Millard, a graduate of the Cirencester College, has been active in making experiments in Suffolk in combination with this Chamber, and has sent me the results he obtained on drilled barley during the past season. The barley was after turnips, sown on April 3, and hoed out on 1st May, every alternate row being removed. But a heavy wind came and the wide-drilled barley specially suffered, much of the grain being blown out. The crop upon three plots was decidedly better than that grown according to the ordinary method, and the other plots were in some cases about equal and in others worse. With reference to our swede experiments, we tried some in 1870, and those results were I must confess difficult to make anything of. In Mr H. Ruck's results we find that a difference in the treatment of the land had had a greater effect apparently than any of the manures he applied. Mr Ruck's plots might have been even divided across by a line, one half of the plots being upon a stale furrow, and the other half upon a fresh furrow. The stale furrow plots produced 15 tons, 15½ tons, 13¾ tons, and 14 tons. The fresh furrows 14 tons, 14 tons, 14 tons, 13 tons, and 12 tons per acre. There was a greater difference between the stale and fresh furrows than was shewn by comparing any of the manured plots together. The drought exercised such an influence that the unmanured plots were as good as the manured.

THE EXPERIMENTS OF 1871.

Now I proceed to the experiments of the past year. We were determined to obtain some good results if it were possible. Accordingly, ten series of experiments were sent out with a view to solving the following questions. Firstly, What is the effect of a heavy dressing of superphosphate contrasted with a light dressing? Secondly, What is the comparative merit of bone superphosphate and mineral superphosphate? Thirdly, Whether any means could be taken to make mineral superphosphate equal in effect to bone superphosphate? Fourthly, To test the value of guano as a manure in this district. Fifthly, To learn the effect of treating guano with sulphuric acid so as to fix the ammonia. The following series of manures is as then arranged:—Mineral superphosphate (heavy dressing), 6 cwt.; mineral superphosphate (light dressing), 3 cwt.; mineral superphosphate treated with organic matter, in a manner suggested by Professor Church, in order to approximate to the composition of bone superphosphate; dissolved bones, 2 cwt.; Peruvian guano, 2 cwt.; sulphated Peruvian guano, 2 cwt. The dissolved bones were found to contain 19 per cent. of soluble phosphoric acid, whilst Mr Lawes' mineral superphosphate contained 13 per cent. It was then in the proportion of 2 to 3; therefore to compare with the 3 cwt. of mineral superphosphate, we used 2 cwt. of dissolved bones. We were disappointed in our experiment with dissolved bones. I wrote to Messrs Proctor for bone superphosphate, but since there seemed a difficulty in obtaining pure bone superphosphate I applied to Mr Lawes for it, that I might test a pure bone superphosphate against a mineral superphosphate. But it subsequently transpired that "dissolved bones" is only a trade expression, not signifying a superphosphate made from bones, but merely a superphosphate of superior richness. Now as to the sulphated guano. This was tried with 2 cwt. of guano to which was added 28 lb. of diluted acid, first mixed with 50 lb. of sawdust.

METHOD OF CONDUCTING AND THE RESULTS OF THE EXPERIMENTS.

I have now to give you the history of the ten series. I will take our disappointments first. One experimentalist was not able to use the manures, and they remained stored for future operations. Two lots went into Suffolk, and there met with a dry season and disease and insect attacks, which interfered seriously with the result. Seven were applied in this neighbourhood with the following results. Mr Parsons, of Coates, very kindly undertook a series, but it was met with difficulties in the form of wireworm, as the plots were placed upon newly-broken land. This rendered the results very unreliable. Mr Playne, of Chalford, wrote to me as follows:—"The experiments were very unsatisfactory, the whole field being patchy; the swedes were hoed December 14 and 16. The field had been in sainfoin seven or eight years previously. Mr Swanwick's plots improved all the way from west to east, so that the unmanured plots on the east were absolutely better than manured plots on the west, thereby shewing that the natural or artificial fertility of the land had had a greater effect than the manures applied." I will now turn to some more useful results. Out of ten experiments you have four or five bearing valuable lessons. Whether this is to be considered a fair proportion I am hardly prepared to say. I think we may take any given experiment to be of most value when we find its result corresponding with the average result. We will take Lord Bathurst's first. I will briefly relate the kind of cultivation pursued. I think you know the land upon which these experiments were tried, and I am not wrong in saying that it is of the customary character of our Cotswold land—a brashy soil. You have there turnips after wheat, cultivated with Colcman's cultivators, ploughed last week in November, stirred first week in May, then cultivated with the usual harrowing, rolling, &c., and sown with swedes after wheat, 4 lb. of swede seed being used. Now, I must just remind you that in our method of conducting these experiments it is very difficult to get the drill to exactly sow the quantities of manure prescribed for so small a plot. We have been in the habit of applying the manure by hand along the top of the rows. The manures are thus not so fully incorporated with the soil as I should like them to be. This was the plan followed upon Lord Bathurst's home farm. The plots (one-twentieth of an acre each) 20 drills each, 23 inches apart, and each plot was 173 links long. The results are given in the diagram, but perhaps the fairest way is to take the average, which you will see in this table :—

Table shewing the Average Increase over Unmanured Plots in Swede Experiments, 1871.

Names of Experimentors.	6 Cwt. of Mineral Super.	3 Cwt. of Mineral Super.	3 Cwt. of Mineral Super. and Organ. Matter.	2 Cwt. of Dissolved Bones.	2 Cwt. of Guano.	2 Cwt. of Guano Sulphated.	Average of Four Ground Plots.
	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Earl Bathurst	2.25	1.72	2.38	1.23	3.74	3.64	3.69
Rev. T. Maurice ..	3.35	2.25	3.34	2.70	3.63	3.50	3.52
Mr Edmonds	4.34	5.00	4.89	5.27	4.14	4.00	4.09
Mr Hobbs	3.72	2.39	3.95	2.72	2.57	2.00	2.28
Average	3.41	2.84	3.64	2.98	3.53	3.28	3.40

A CONSIDERATION OF THE RESULTS OBTAINED.

Now as to the questions which our series was intended to elucidate. First, dressing with 6 cwt. of superphosphate. Answer : 6 cwt. gave a better result than the 3 cwt., but the result from the 3 cwt. taken relatively to the cost paid better. Second question : Bone *versus* mineral superphosphate. Here a distinct answer is given ; the dissolved bones appear slightly worse than the 3 cwt. of mineral superphosphate. The most interesting point is where we employ the organic matter you will observe that the 3 cwt. has increased the yield above that of the 6 cwt., and that the result is followed out in the other experiments. Guano gives a considerably higher increase than any of the rest. The average of the guano is 3.69. The results are these : That 6 cwt. of superphosphate is not profitably employed against 3 cwt. That the dissolved bones give a dubious result. That the manure mixed with organic matter has been followed with good results ; and that this season has been a good one for guano. I think the peculiar character of this season has been one of the reasons why guano has been so beneficial. Then, again, the advantage of fixing the ammonia by sulphating does not appear. Now the Rev. T. Maurice's experiments. These manures were applied on June 3, in the same manner, sown by the dry drill ; the average distance between the drills was 27 inches, and 20 drills to a plot. These experiments were, on the whole, satisfactory. First answer with respect to heavy or light dressing. The Rev. Mr Maurice's plots give a better amount with 6 cwt. than with 3 cwt., the same as Lord Bathurst's, but the increase is not equivalent to the increase of the dressing applied. Organic matter gives a decided increase, growing a larger yield than either of the others. Guano, both ordinary and sulphated, exerted a most marked effect in this series, and in this respect agrees well with the other tabulated results, but here also the sulphated guano was not observed to be superior to the ordinary guano. Mr Edmonds' experiments come next, and the most marked effects were produced upon his farm. I have before alluded to the somewhat imperfect manner which we have yet followed in applying manures. I wish we could mix them more with the soil; but that our manures do exercise considerable effect is, I think, evident from such results as have been obtained by Mr Edmonds. His series were carried out upon very poor land, which for many years had no farm-yard manure. Mr Edmonds does not get a large crop ; he gets a small crop, 7 or 8 tons to the acre, but the increase was more marked in his case. The table shews that although the effects are greater, yet the questions are answered in the same manner as in Lord Bathurst's and Mr Maurice's experiments. They bear out that a heavy dressing of superphosphate does not seem to have an equal effect with a moderate dressing of 3 cwt. Mr Edmonds got a better result with 3 cwt. than with 6. Mr Edmonds' organic matter gives a better increase. He did not get so good results with guano as with superphosphate. The last experiments are those of Mr Hobbs, and his results agree with the other three. Again we have a fair result in the case of guano. The lessons which appear to occur to my mind are, that according to the experiments of this last year we are not able to shew that 6 cwt. of mineral superphosphate can be applied with a greater advantage than 3 cwt. The averages from 6 cwt. equal 3.41 tons ; 3 cwt. equal 2.84. But if you compare the organic matter results you will find that it gives a higher result than the 6 cwt. Guano comes next to manure with organic material in it.

COST OF THE INCREASED CROP.

Now, the cost of the increased crop. The superphosphate was purchased at 6s. per cwt., and when it was applied the increase obtained was at the rate of 10s. 6d. to the ton. With 3 cwt. the increase was obtained at the rate of 6s. 4d. per ton. With 3 cwt. of mineral superphosphate with organic matter the increase was obtained at 5s. per ton. Two cwt. of dissolved bones gave an increase to swedes at the rate of 4s. 8d. a ton, and the 2 cwt. to treated guano gave an increase to swedes at the rate of 8s. a ton; and, lastly, the four guano plots gave an increase at the cost of 8s. 5d. per ton. So, although for quantity the dissolved bones did not appear favourably, it was cheapest, giving an increase at 4s. 8d. a ton; and the 3 cwt. was next cheapest with 5s. per ton. Lastly, with reference to our experiments, I should be very glad if some practical suggestions could be given as to the manner in which to carry them out. I think the system of applying the manure to the top of the soil does not give the full effect. Then, with reference to the heavy dressing it is a pretty clear conclusion that the heavy dressing of 6 cwt. of superphosphate was not applied with advantage; but is it not a question whether the maximum effect which could be produced by heavy dressings of mixed manures would not be more than this? Then, again, I think we cannot look upon the results produced by guano without thinking that guano has been neglected in this neighbourhood. I believe this is very little used, and yet it becomes a question whether we should not use more. But it is not likely that a mixture of guano and superphosphate might be of decided advantage.

INFERTILITY OF OLD CROP-BEARING LAND.

By Mr HUTCHESON, Upperton of Gask.*

AT the time when the majority of us began to take an active part in the great battle of human life, the one feeling which dominated and absorbed the mind of the agricultural community was how best to conquer and subdue the barren wilderness which, from time immemorial, had divided with the arable land in unequal proportions the acreage of the north. To increase the size of a farm, either by the absorption of an inconveniently situated neighbour, or by the reclamation and cultivation of waste lands, has, so to speak, been the ruling passion of our times, with what success the development of that sentiment has been followed, let the rent rolls, the exports of corn and cattle, and the thriving homesteads that have sprung into existence during the period referred to bear witness. Never did the beacon fires that told to our warlike ancestors that the fierce Norsemen had come to wrench from their grasp the scanty substances which a barren soil and an ungenial climate yielded to their rude labours, or heralded the approach of the yet more hateful southern, who vainly sought to trample under foot the liberties of an antient race, burn more brightly, or with a fiercer glow, than did the muir burn that, thirty years ago, lighted up the heath-clad muirs of Aberdeen and Banffshires, the pioneer on whose blackened track moved the ploughshare or the spade and pick-axe of the agricultural labourer. Two important elements contributed to produce the stupendous improvements of this era in agriculture. One was the introduction of pipe and tile draining; the other, the discovery and application of Peruvian guano and chemical appliances. The one skilfully applied dried the unhealthy morass, the sedgy meadow, the dangerous mosspits which abounded on all hands; the other applied to a friable and prepared soil, in conjunction with lime, has everywhere raised from the minimum of land the maximum of crops. But that era, productive of great results and unexampled in the annals of Scotland, is now well nigh closed. As Alexander the Great wept when he had no more races to conquer, so the husbandman has reached the point where his genius for reclamation must pause for want of fresh fields, whereon he may display his prowess, and if my observations have not been illusory, and my calculations the result of error, that era will not close a day too soon, for side by side with the greatly extended era of cultivation, there has crept in a gradual and slow but sure decay in the fertility of the old cultivated land which fifty years ago formed the whole source of our agricultural productions.

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* Read before the Turriff Agricultural Association.

DETERIORATION OF CROP-BEARING QUALITIES.

It would seem as if, in our efforts to increase the arable acreage of the country and to subdue and overcome the difficulty, we had neglected or stinted that of which we were in secure possession. Forty years ago the products of the "intoon," whether in grass, oats, or barley, more than doubled the products of the outfield. Now the balance of crops is in favour of the outfield, and this would be a cause of rejoicing if this reversal of old times were merely the result of superior methods of farming, by which the fertility of the outfields had been so increased as to be the sole cause of this result; but the fact is undeniable that while the outfield has been *brought up* in its fertility, the infield or old crop-bearing land has not been *kept up* to its former degree of fertility. Is it necessary to call evidence in proof of this statement? Thirty years ago the glebe and feued lands of Turriff yielded their 8 quarters per Scotch acre, now they will not yield an average of 6 quarters over the same measure. Five-and-thirty years ago I cut with my own hands, on the infield of Upperton, a rich swathe of fresh green clover; on the same land it now only exists in a stunted and precarious condition. I have seen the same land produce a sample of potato oats as much superior in plumpness and size to the potato oats exhibited in our show-yards now as the bean is superior in size to the pea. And this state of things is not a solitary instance to be accounted for by a cause peculiar to a particular farm, but extends over the whole area of old crop-bearing land, as far as my observation has been able to extend. Time was when the Garioch was designated the granary of Aberdeenshire. Now the old moors of Fyvie and Monquhitter surpass it in productiveness. If we look at the weight of turnips yearly registered by the Garioch Farmers' Club, we will find that many districts of country now exceed them where many years ago the poorest of game gleaned but a scanty subsistence.

WHAT HAS CAUSED THE INFERTILITY?

The infertility thus manifesting itself on our old crop-bearing land must, under any circumstances, form subject of grave consideration; but when we reflect that those lands are for the most part the deepest and richest of our original soil, and that the land which now exceeds them in fertility is for the most part thinner and less rich in its original character, we are irresistibly led to the conclusion that a much shorter time of the system of cropping than has led to infertility in the old crop-bearing land will suffice to produce on the old waste land a universal and more complete deterioration, and restore again to the wildness of nature thousands of acres which the strong arm of the agriculturist had added to the meat-producing acreage of the country.

Now, admit this fact in a greater or less degree than I have stated, according to your personal knowledge and judgment, one thing must follow as a necessary corollary. The difficulty has to be met, and if possible to be overcome, and to give us a fair start in this crusade, two things require to be studied and well thought out. First, What has caused this infertility? And second, How is it to be checked and overcome? To the first part of the inquiry, How has it been produced, there will be, I apprehend, but little difficulty in obtaining a general agreement. All crops take from the soil the constituents of their existence, and if no portion of what they extract were returned to the land, complete barrenness would very soon manifest itself. This, however, is to a great extent obviated by changes in the description of crop, and by the return to the soil, in the form of manure, of a proportion of the constituents extracted by the crops. A part, however, of those constituents are never returned; but in the form of beef, mutton, pork, eggs, and grain, are exported, and by those who purchase them recklessly wasted, rendered irrevocably lost to the agriculture of the country. In 1859, Mr John Millar read before a meeting of the Philosophic Society in Aberdeen, a statement, by which it appeared that a manurial value, in the form of sewage, to the extent of £42,000 was annually poured into the Dee, and from thence carried into the ocean. Now, if such a fact is correctly stated as regards the city of Aberdeen, what an enormous source of agricultural wealth is every year lost by the aggregate sewage of all the cities of the empire? And looked at in the light of such facts, how little need we wonder that the oft-cropped land begins to shew signs of weariness, and to miss the healthy and life-giving constituents that it has parted with, and which can no longer be returned to it. Moreover, the system of cropping in recent years has, in no small degree, contributed to aggravate that weariness. The five-course shift rotation, while it has done much to clear the lands of weeds, has certainly weakened its productive powers, and pre-disposed to plant-life diseases. The change from four exhaustive crops out of seven, to three out of five, has told fatally on all light lands more or less previously disposed to poverty and barrenness.

HOW TO REMEDY THE EXHAUSTION OF THE SOIL.

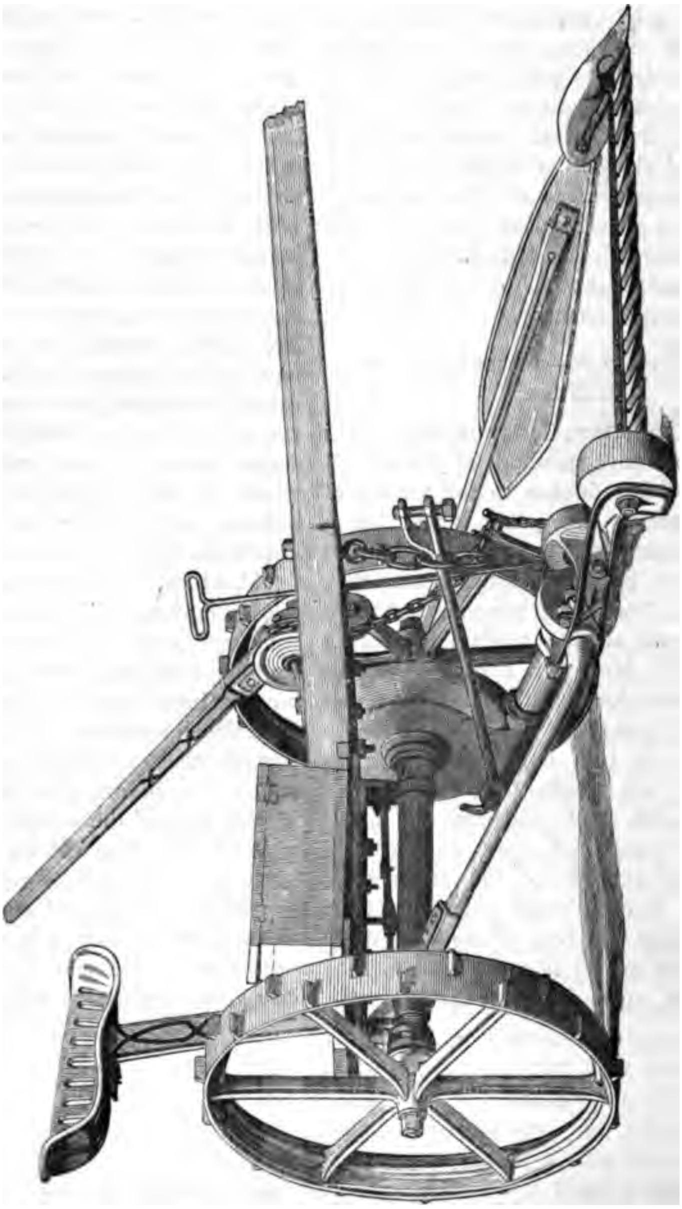
This being so, we naturally come to the second matter, already referred to, and which is by far the most serious and difficult of solution—namely, how to remedy and overcome this natural tendency to decay? We cannot wait until the large towns of the empire organize a system of sewerage that shall return to our corn fields the valuable constituents they have parted with, but must endeavour to find other sources and means of redress, and assist those means by such a change in the rotation as shall best enable us to accomplish the desired results. In this respect it seems to me that agricultural chemistry must play a greatly more important part than it has hitherto done. It is of very great importance that every cultivator of the soil should have an easy and simple means of obtaining a correct and disinterested analysis of the artificial manures he applies to the soil; but it seems to me that it is greatly more important that he should have such analysis of the land to which he applies them, as will enable him to apply such manures as the state and condition of his land requires. Let me illustrate this by an example. On newly cultivated land, which prior to its cultivation never yielded its occupier 2s. 6d. an acre, I have had 7 qr. of oats per imperial acre when in crop, and the richest of hay and pasture-grass while in grass; while on old land, manured at the same cost, and with the same proportions of farm-yard manure, bones, lime, and other chemicals, I have rarely exceeded 5 qr. in oats, and have entirely failed in obtaining a hundreth-part of the clover yielded by the former. My inference is that a constituent exists in the former that is absent in the latter. What is that constituent? And without an exhaustive analysis of both soils, how am I to obtain the knowledge ary to enable me to make an intelligent ation of the required manure? It may e that the cost of such analysis might many of us from following it out to its ate extent; but the same causes that ce decay in one case have produced it majority of cases, and an association s ours might wisely, in the interests of merous members, obtain a sufficient er of analyses to guide the agriculture of strict, without seriously interfering with nds at its disposal. Meantime, every r would do well to mark off in every n average portion of its soil on which ry stage of its rotation he might, on a but accurate scale, experiment with the s chemicals known to agriculture, in s degrees of quantity.

EP CULTIVATION—PRESERVATION OF MANURE.

t less important, in my opinion, would more incisive method of tillage. It een said in reference to the method of in remote times, that it was but a scratching of the ground. Are we urselves becoming little better than hers? Does a 5 to 7-inch furrow place r disposal all the available resources e land? Moreover, does not the very ment we plough with press upon and n that immediate subsoil which we do ttempt to turn over. In reclaiming land, we trench to a depth of 14 s of solid land, and turn up to the e the purest of clays and gravels, , when exposed to the atmosphere, reated vigorously and generously, yield due time the best of crops. Might ot fairly expect that a similar method atment, applied to our exhausted soils, would give a similar or even better return, and if this process involves a labour and cost too great to be readily and generally adopted, might we not at least loosen the underlying stratum by subsoiling, and thereafter extend our 7-inch furrow to 10 or 12 inches? Not the least advantage to be hoped for from the application of steam power to field labour, now only a question of time, is the thorough stirring up of long dormant soil, or the smashing and breaking up of hardened substratum, which, in its present form, is alike impervious to the absorption of excessive moisture or to the nourishment of plant life in seasons of prolonged drought. And while we deplore the excessive waste of town sewage, let us make sure that the sewage of the farm is not in like manner wasted. I have long been of opinion that, where an abundance of litter existed on a farm, and where the dung heap was not exposed to rainfall nor to a flow of surface water, it would absorb the liquid manure of the cattle sheds, but where this is not so, and it is very rarely so, provision should be made for absorbing the surplus liquid, which, mixed with earth, or weeds, or road scrapings, will in most cases yield a sufficient top-dressing for a-fourth part of the lea field about to be cropped, and will by so much reduce the annual expenditure required for artificial manures. It is of the last importance that an early change be effected in the rotation of cropping generally practised in this part of the country. Fewer crops within a given time and more rest are absolutely necessary for the restoration and reinvigoration of our old and worn-out soils, and will, in the long run, well repay both proprietor and tenant the temporary loss caused by so desirable a change.

A NEW SCREW MOWER.

TAKING time by the forelock, Messrs Peter Lawson & Son have, this season, announced that they are to introduce a ew reaper and grass mower, for which they n several advantages over others in the field. It is stated that it wrought well on trial in grass on the Craigentinny Meadows We have not yet seen it working, and it wi be noticed that it works on the Arch medean screw principle.



New Screw Reaper.

WASTE LANDS IN ENGLAND.

THE Enclosure Commission in their twenty-seventh annual report state that during the last two years no General Enclosure Act authorizing enclosures, based on the Provisional Orders issued under the 8th and 9th Vic. cap. 118, has been passed; and, pending the decision of Parliament as to the future policy in regard to the enclosure of waste lands, they have felt it their duty, in justice to the parties interested, to discourage fresh applications for enclosure, and to prevent parties incurring the expense of holding preliminary meetings which might in the end prove fruitless. The Commissioners state that the object of the General Enclosure Act, as explained by the report of the Select Committee of 1844 which recommended it, was to bring into use that large portion of the waste land of the country which was capable of profitable cultivation or other improvement, but which, from the expense of procuring and carrying into effect private or local Acts, was suffered to remain comparatively unproductive. The extent of waste land held in " common " was then (says the *Times*) estimated at 8,000,000 acres, and that estimate was based on a return (taken partly from every county in England and Wales) of the actual amount of " common " found on an area which embraced one-fifth of the whole country. It may therefore be assumed to give a fair representation of the extent of " common land " at that time.

In addition to the " common lands " there is also a considerable extent of " commonable land," that is, land held in severalty for a portion of the year, upon which, after the summer crops are removed, certain rights of pasturage are exercised in common during the remainder of the year. This was supposed to comprise 2,000,000 acres, but there is no certain basis for this estimate.

It is to be observed that these " commonable lands " are subject to tithe rent-charge, and are also liable for land-tax and to rates for parochial and local purposes. The estimate of 1844 of " common " and " commonable " land together, at somewhat over 9,000,000 acres, may, the Commissioners think, be accepted as fairly accurate. In the twenty-five years since the passing of the General Enclosure Act, 670,000 acres of these lands have been and are in course of being enclosed, an extent equal to an average English county. This leaves fully 8,000,000 acres still to be dealt with which is more than one-fifth of the entire acreage of England and Wales. Of this vast extent of country there is reason to believe that upwards of 3,000,000 acres will be found in the lowland counties of England, and the remainder in the mountainous and moorland counties, and in Wales. A large proportion of the " commonable lands " which are situated chiefly in the lowland counties, is undoubtedly susceptible of more profitable use and cultivation after enclosure.

In addition to the " commonable land " (which at present is more or less under cultivation), it may be assumed as a very moderate estimate, that out of the " commons," 1,000,000 acres might still be added to the productive area of agricultural land in England. To accomplish this, at the rate of progress hitherto made with enclosures, many years must necessarily elapse. Even when that is completed, there would remain about one-sixth of the area of the entire country still open, and subject to rights of " common," an extent so great as must shew how erroneous have been the apprehension expressed of the speedy enclosure of every common in England. In estimating the value to be attached to these figures, it will be borne in mind that they apply to a country of limited extent, where mining and manufacturing industry, railway extensions and urban population are constantly pressing upon the narrow limits of the cultivated land. The addition of 1,000,000 would be sensibly felt; it is more than has been won from the sea in three centuries and a-half by the laborious industry of the Dutch, and would be nearly equivalent to one-tenth of all the land at present under crops in England, exclusive of grass. This would be an outlet for labour and enlargement of cultivable country exactly the same as an addition of an equal extent of territory. Nor should it be forgotten that, when enclosed and cultivated, these lands would become a source of further revenue for all purposes of Imperial as well as local taxation, and, being held in severalty, would add to the quantity of land capable of being brought into the market for sale and purchase. By the Metropolitan Commons Act no "common" or "commonable" land within the area of the metropolitan police district can now be enclosed (that is divided and allotted in severalty) under the General Enclosure Act of 1854. And it has been proposed to adopt the same policy with reference to unenclosed lands within certain distances of towns with large populations, and thereby preserve open land in the immediate vicinity of such populations. Though it is advisable in the public interests to guard against such populations being hemmed in by injudicious enclosures, it should also be remembered that in some cases it will occur that the population is now hampered, and the interests of the town are injuriously affected by the proximity of "common" lands, which, not being private property, cannot be sold or dealt with for building and other purposes. Outside the line which may be thought necessary for preserving in perpetuity sufficient open spaces for fresh air, exercise, and recreation, the advantage to the country socially, economically, and financially, that every acre of its cultivable soil should be rendered as productive as possible, must be worthy of consideration.

With regard to the labouring poor, the provisions of the Enclosure Acts are often misunderstood. The Commissioners are empowered, as a condition of an enclosure, to set out where neccessary a specified extent of land for the labouring poor. But that is not to be given them in property as to the owner of common rights. The labouring poor's allotment is to be let to them at a rent not lower than that of other agricultural land in the neighbourhood. They are not allowed to build upon it, or to exercise any rights of ownership. The object was merely to supplement, where necessary, garden allotments for the labouring poor. A combination of good quality of land, and proximity to the dwellings of those for whose use they are set out, would appear essential to render those allotments a real advantage to the labouring poor. This combination is too seldom found in "common" land. The adoption of the principle in the Bill, reported from a Committee last year, that in all cases some land should be set out for this purpose, with powers to exchange it for other land more suitable if opportunity occurs, will go far to assist in promoting this combination after an enclosure has been authorized. Of all modes of land tenure in a fully peopled country there is none more prejudicial to improved cultivation than that of holding in common. The present large extent of open "common" land cannot be needed in rural districts for the health and recreation of the people. And if Parliament should sanction the proposal in the Bill of last session that a larger extent than heretofore of the surface of future enclosures shall be reserved for public uses, this, even in the richer counties where enclosures will most rapidly proceed, will secure adequate room for the exercise and enjoyment of the people, while, in addition to this, in the poorer and more mountainous districts there will long remain extensive wastes too poor in quality for any purposes of agricultural improvement, though the value of some portions might be capable of improvement by planting, and for pasturage. In this as in other civilized countries it has hitherto been held meritorious to increase the fertile area of its soil; and the Commissioners believe that still to be attainable in England to more than the extent already named. It would seem, therefore, they conclude, desirable in the interests of the public, that there should be no further postponement and delay in the decision of a question affecting so large a proportion of the improvable surface of the country.

We sincerely trust that the recommendations of the Commissioners will be carried out, for in a country of such limited extent as our own, and with our teeming population, it seems almost wicked that such a breadth of ground should carry nothing but weeds and thistles, when the application of some of that abundant capital which is always forthcoming not only for feasible but at times for very wild schemes, would make it yield good food for man and beast, and employ in honest labour thousands of hands which are now idle or worse. The question is a very important one, and we should like our philanthropists who are urging the rural population to leave their country would devise some means by which they could be kept in comfort at home in cultivating the now profitless grounds. Were these in tillage, poor-rates would be lowered, and prices of bread-stuffs and animal food cheapened.

GOAT FARMING.

GOATS, as a rule, do not care much for civilized society. In fact they prefer what writers now call "barbarism" a great deal more than the pampered life which—say, sheep and oxen intended for Christmas shows, lead. And to the credit of the directors of these shows, be it said, that hitherto they have respected what we have assumed to be the retiring nature of the goats, for there is not in any schedule, to the best of our knowledge, to be found a prize for those sure-footed and hardy animals. But then why should goats any more than children be allowed to roam at their own sweet will? The School Boards are bringing the two-legged little wanderers to book. Why should not agriculturists put restraint upon the horned, bearded, and four-footed animals? Profit to the nation is expected from this tuition of neglected children, and profit to the farming community might result from a better cultivation of goats. We may state that at the present time goats' milk cheese is sold at 1s. 6d. per lb., a longer price than the compressed lacteal fluids of other animals bring—and the milk is always extremely valuable for invalids. "Eggs is eggs," is an old ungrammatical saying; and, perpetuating the outrage upon Lindley Murray, we shall say "goats is goats," and they ought to be better looked after. They can live where other animals would starve, and they are kept out of their living by starving animals. The herbage that a goat could browse and get fat upon, makes sheep lean and ill. Let us then utilize the animals more than we have hitherto done.

To get their proper value out of them we must treat them with care and attention; for although they are hardy, they require shelter in order to the production of a large quantity of milk, and for the health and progress in growth of the kids. But though shelter is necessary, we must not conclude that goats like close habitations. The impure air is more hurtful to their health than the inclemency of the seasons. In order to obtain a healthy goat house it should always be clean and well aired—warm for the milch goats and kids—rather cool than warm for the other animals, and built so that the pure air may be constantly renewed.

The ceiling ought to be about 7 feet high. The animals should be kept from the dust of the hay loft, and the fodder so placed in the upper storey as not to be penetrated by the fumes rising from below: it would be well to have the rafters plastered.

The site of the goat house ought to be chosen with the greatest care. If possible, it should be placed on a gentle declivity, slightly inclined to the south-east—damp grounds and muggy airs being very hurtful to goats at all times.

Goat houses in which the conditions referred to above can be secured, may be made of any material the owner chooses. About 57 inches is the average superficial space allotted for a he, or for a milch goat.

The interior of the goat house should be divided into compartments for the various breeds; say one for the common goat of the country, others for foreign, milch, and long-haired breeds. Each of these large compartments ought to be sub-divided. One division should be for goats with kid, and another for sick animals. An open space in the middle of the goat house will be for kids at the weaning time. We give here (fig. 1) the sketch of a house which, according to our opinion, unites all the conditions of a good interior arrangement. At the east, a porch where the food is to be prepared—there will be for that end a stove, F; E is a staircase leading to the fodder loft and the provision room; B B, large compartments for the young weaned kids; C C, cells for the goats with kid. These cells are large enough to hold two easily; D D, cells for sick animals, and can also be used to shut up the males; G G, racks; H, troughs; I, large door opening into the porch; K, mill for crushing grain and cake. Each large compartment could hold twelve goats and a ram, besides kids. The whole of the building shews about 27 feet of frontage by 17 feet in depth.

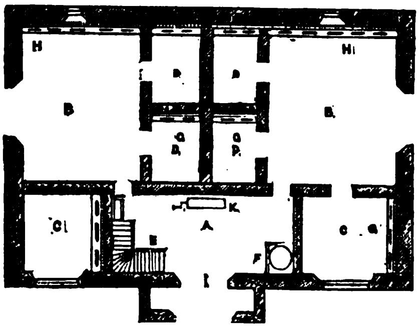


Fig. 1.—Plan of Goat House.

The goat although long a domesticated animal has lost neither its petulancy nor its wandering nature. Although it is strong and robust, it dislikes wet, cold, and great heats. During the cold rains it is restive outside, tosses its head, and shakes and runs towards the goat house or farm, as we may call it. Left out in bad weather, the females give little milk. Goats we need scarcely say prefer the mountains to the plains, there they can graze on fine herbs and brushwood, which even mountain sheep care not for—on lowland meadows they are subject to indigestion.

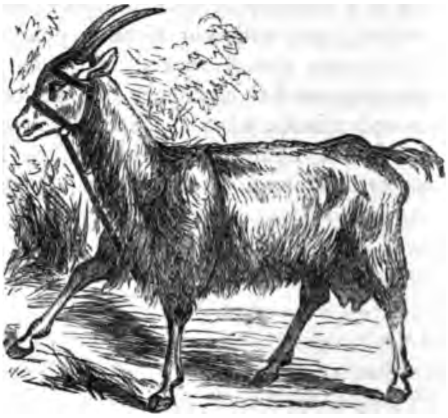


Fig. 2.—Goat Bridle.

They browse on the dried-up herbs that are trodden, withered, faded with the rain, shoots of herbs completely ligneous, and live and give milk where other animals would die of want. They are, it should be observed, very destructive to young trees and shrubs, and should therefore be left loose only in tracts of waste and scrubby land, in furze or on rocks, where only brambles and brushwood grow. They should not be left without muzzles in the roads, for they nibble the evergreen hedges, and even bark the trees on the roadside. After reaping is completed they find excellent pickings in the fields from plants that other stock care not for, and these they transmute into a plentiful supply of their valuable milk.

The best means for muzzling them when necessary, in our opinion, is the method we illustrate. Put on the animal, a breast collar, with strap and martingale, as in fig. 2. This arrangement, as will be seen, leaves the animal's movements entirely free, allows it to walk and to pasture as it likes, at the same time that it effectually stops it from browsing upon the branches of trees and hedges. When the goats have arrived at the stable, the swivel is loosened, the girth raised, and if it be judged expedient, the thong provided with its swivel serves to fix the animal to the manger.

Goats can be first stabled or housed not only without suffering from the confinement, but even with advantage. The experiment, we are told by a French journal, has been sucessfully made in the environs of Lyons. With large flocks which never even go out at all, lucern grass, clover, vetch, and chickweed are excellent food for goats. The last-mentioned given after the flowering, when the seed is almost ripe, excites the flow of milk; but clover and particularly lucern grass, are sufficient during the greater part of the summer. A variety of cabbages are also cultivated, which by the special place given them are called "goat cabbages." These are very valuable at the end of winter and in the months of March and April. Goat cabbages have sometimes a stalk nearly 3½ feet in height, often have several heads, are hardy in constitution and make much fodder. Vine leaves are also good food for goats. They are picked up after the vintage, and put in tubs or vats, where they are pressed very tightly and covered with water. A little salt, some juniper berries and aromatic plants, mixed with the vine leaves, make them more palatable. The leaves of the vine thus prepared keep very well, and remain green if they are not exposed to the air, but if taken out of the water they become withered. They are used during winter, and great care is taken that only those which are to be given immediately to the animals are brought out to dry. Vine leaves by themselves are not very nourishing. In fact the goats fed exclusively on them become thin, and give little milk which is of an inferior quality. Mixed with bran, roots, husks of nuts, &c., they form a good food, and produce milk capable of being made into excellent cheese, which keeps fresh a long time. Less watery than most green herbs, they impart density to the milk, that is to say, they produce much cheesy substance and little whey.

Although all herbaceous fodders are suitable for goats, they ought to be given with certain precautions; young, soft, and watery plants given largely, occasion in some cases diarrhœa, and, in all, produce poor thin milk, which melts into whey.

Goats gnaw bitter vegetables, and the insipid leguminous parts of plants; eat bark, and the branches of trees too hard for cows and sheep: the goat farm, therefore, is easily furnished with food. To use advantageously all the different vegetables that goats eat, mix them with the residue after the making of wine, cider, beer, and oils. The residue of grapes, even after it has been diluted for inferior wine, or distilled for brandy, is acceptable to goats. Beer is seldom given alone, but it is frequently given mixed with herbs. The husks of nuts cause plenty of milk that makes capital cheese. Whey, especially that of salted cheese, is very good feeding when mixed with bran and herbs. Other food used for stabled goats in France is made in winter from beet-root, potatoes, apple-parings, bran, flour, grain, hay, &c., and in summer, with lucern grass, clover, herbs growing in the vineyards, the gardens, the hedges, always mixed with liquid. Salt is little used, but it is as indispensable to the health of goats as of other animals. Each animal ought to have weekly, from ¾ of an ounce to 1 ounce of salt, and the dose should be increased during the wet seasons. If, during the latter period, the appetite falls off, the salt should be mixed with half the quantity in weight of juniper berries, or crushed roots of yellow bitterwort These act as a tonic, and bring back the appetite.

We have no vine leaves here as they have in France, but we have plenty of the refuse of distilleries and breweries. We have larger cabbages, potatoes in abundance, apple-parings, cider presses, bran, flour, hay, &c. We have plenty of demand for goat-milk cheese, and the milk would be eagerly bought from any recognized depôt. It might be worth while farmers in mountainous districts, or in districts adjacent to the hills, to start such a farm as the one we have described.

At all events, we think that, by attention, more might be made out of these valuable milk-giving animals, which, as we have said before, can browse and live healthily on herbage which cannot feed any of the other domesticated animals.

LUPINS AS FOOD FOR GATTLE.

MR FREDERICK A. MANNING writes to our contemporary, the *Mark Lane Express*, with reference to the advantage of cultivating Lupins as food for cattle; adding, in a postscript, that he is of opinion that it would be well to try the yellow variety of lupin, that being preferred in Germany. It is less bitter than the blue. He says:—

The advantage of extending our resources in food stuffs is sufficiently obvious, and at all times worthy of consideration. My attention was lately drawn to it by Mr W. W. Kilpin, of Bickerings Park, near Woburn, Beds, from whom I received a sample for examination that was grown on his farm. The analysis of this sample I append:—

LUPIN, blue variety (Lupinus ceruleus).

Moisture	12.00
Nitrogenous constituents	32.72
Starchy constituents	47.01
Fat	5.15
Mineral constituents	3.09
	99.97

The value of this seed as a cattle food will, from its highly nitrogenous and oily character, be at once apparent; it is, in fact, too rich in nitrogen to be used alone as a food, and would require mixing with some of the more starchy foods, such as Indian maize, to reduce the nitrogenous to starchy constituents, to the best proportions for feeding purposes, and avoid the evils of a too-heating food. The lupin appears to be the most highly nitrogenous of all the leguminous tribe grown in this country as cattle food; in fact, I am only acquainted with one specimen, and that a native of China, the black bean (Soja hispida), which is more so.

Through the kindness of Dr Forbes Watson, the reporter on Indian products to the Secretary of State for India, I am enabled to add for comparison a copy of the analysis of the Soja hispida, and also of some allied Indian pulses, which were made by me for his department. These are highly prized in the East as food stuffs. Some are eaten by the natives, and all largely used as cattle food, the lentils being the least prized:—

GRAM (Cicer arietinum), pea tribe.

Moisture	10.86
Nitrogenous constituents	21.17
Starchy constituents	60.11
Fat	4.47
Mineral constituents	3.39
	100.00

PIGEON PEA (Cajanus indicus).

Moisture	10.77
Nitrogenous constituents	20.19
Starchy constituents	64.32
Fat	1.32
Mineral constituents	3.40
	100.00

LENTILS (Ervum lens).

Moisture	12.70
Nitrogenous constituents	24.57
Starchy constituents	59.43
Fat	1.01
Mineral constituents	2.29
	100.00

WHAL (Lablavia vulgaris), a bean.

Moisture	10.81
Nitrogenous constituents	24.55
Starchy constituents	60.81
Fat	0.81
Mineral constituents	3.02
	100.00

BHOOT (Soja hispida), black variety.

Moisture	10.40
Nitrogenous constituents	41.54
Starchy constituents	30.82
Fat	12.31
Mineral constituents	4.93
	100.00

INDIAN MAIZE (Zea Mays).

Moisture	12.90
Nitrogenous constituents	9.23
Starchy constituents	74.63
Fat	1.59
Mineral constituents	1.65
	100.00

Of the gram (Cicer arietinum) Dr Watson says, "Of the pea tribe it occupies an important position. It is largely used by the people, and constitutes besides the great horse food of northern and western India. It can be used for this purpose for a length of time without causing heating or other deleterious effect ordinarily produced by the too exclusive use of beans and peas in this country."

A comparison of these analyses shews the nitrogenous constituents to be much higher in the lupin than in any other grain, except the Soja hispida. With the exception of the maize, and perhaps the gram and Cajanus, all would require dilution with some more starchy food for constant daily use, to counteract the heating effects, and this applies in an especial degree to the lupin.

The lupin contains a powerfully bitter principle, much liked by sheep when accustomed to it, and this will commend it to those farmers who are in the habit of using spiced foods. Another recommendation in the culture of the lupin is the fact that it will grow on almost any soil. Mr Kilpin says:—"On the 20th of April 1871, on the top of a very poor sandy hill, where seeds sown had utterly failed, I sowed, without a particle of manure, 4 bushel of lupins on 2 acres, and harvested a very good crop. The cost of the seed was 35s. for the 2 acres, and the yield 60 bushels. I intend this year sowing 6 acres. The lupin requires keeping in the same manner as beans before being used for sheep or cattle."

A friend, who has farmed largely in Germany tells me both the blue and yellow variety (Lupinus ceruleus and Lupinus aureus) are largely grown in the extreme eastern portion of that country—the former for ploughing in green as a preparation for the succeeding crop; the latter for seed, which is ground and used as sheep food with turnips and other succulents. He also says "it grows on the poorest soils." The straw, which is hard and woody, is in Germany steamed with other food in admixture. I regret I had none of this for examination.

The gram contains 21 per cent. of nitrogenous substances; English beans, 24 per cent.; English oats, 15 per cent.; Indian maize, 9 per cent. Equal parts maize and lupins would reduce the nitrogenous matter in the mixture to about that of the gram. Three parts maize to one part lupins would equal the oat; these two proportions would probably answer all purposes of a good cattle food.

The increased value of the manure is a matter that must not be overlooked in valuing a highly nitrogenous food. The first-mentioned admixture of equal parts maize and lupins will probably be found an excellent one for sheep when eaten with turnips on the land, and will doubtless produce its mark on the succeeding barley crop.

THE SHORTHORN BREED OF CATTLE.

THE following is an abridgment of an article which appeared in the *Field*, from the pen of Mr John Thornton, editor of "The Shorthorn Circular." Mr Thornton's long connexion with the best class of shorthorn cattle, enables him to write with authority on this subject:—

The shorthorn breed of cattle may be fairly called cosmopolitan. Its habitat is everywhere. From one small spot in Britain, its native home, it has spread through this country till it is found from John o'Groat's to Land's End; everywhere in Ireland it prevails; to most parts of the globe it has emigrated; and the present year opened with an importation of three shorthorn heifers and a bull by the Government of Japan.

Mr Charles Colling, of Ketton, county of Durham, a man of great judgment and sagacity, was the first to bring the breed prominently into notice. He collected the best specimens together, and by careful selection and breeding, reared a herd of fine cattle, which arrived at maturity much earlier than had previously been known. His brother, Mr Robert Colling, of Barmpton, was also an eminent breeder, and followed in the same course. Both brothers at first used the same bulls. The former bred an ox of wonderful dimensions, whose live weight was 34 cwt., and the latter a white heifer of equal celebrity. The bull Favourite (252) was their sire. They travelled throughout England, and were exhibited in London as well as at country towns. This circumstance, coupled shortly afterwards with the sale of Mr Charles Colling's herd in 1810, at an average of £151, 8s. for forty-seven head, brought the breed into notoriety, and from the beginning of the century shorthorns began to spread until they may now be found in every country.

The breed is distinguished by its symmetrical proportions, and by its great bulk on a comparatively small structure, the offal being very light, and the limbs small and fine. The head is expressive, being rather broad across the forehead, tapering gracefully below the eyes to the open nostrils and fine flesh-coloured muzzle. The eyes are bright, prominent, and of a particularly placid, sweet expression, the whole countenance being remarkably gentle. The horns (whence comes the name), are usually short, springing well from the head, with a graceful downward curl, and of a creamy white or yellowish colour, the ears being fine, erect, and hairy. The neck moderately thick (muscular in the male), and set straight and well into the shoulders, which, when viewed in front, are wide, shewing thickness through the heart, the breast coming well forward, and the fore legs standing short and wide apart. The back, among the higher-bred animals, is remarkably broad and flat, the ribs springing well out of it, barrel-like, and with little space between them and the hip bones, which are soft and well-covered. The hind quarters are long and well filled in, the tail being set square on to them; the thighs meet low down, forming the full and deep twist; the udder not too large, but placed forward, the teats being well formed, and of a medium size; and the hind legs standing short and straight to the ground. The general appearance should shew even outlines. The whole body is covered with long soft hair, there frequently being a fine undercoat, and this hair is of the most pleasing variety of colour, from the soft white to the full deep red. Occasionally the animal is red and white, the white being found principally on the forehead, underneath the belly, and a few spots on the hind quarters and legs; often the whole body is white, with the neck and head partially covered with roan, while, again, the entire body is most beautifully variegated of a rich deep purple or plum-coloured hue. On touching the points, the skin is found to be soft and mellow, as if lying on a soft cushion. In animals thin in condition a kind of inner skin is felt, which is the quality or handling indicative of those great fattening propensities for which the breed is so famous.

The Ketton herd was of this character, the knuckles or shoulder points being rather strong and somewhat upright. The red colour of some of the cattle was of a yellow tinge, and this may still occasionally be seen Many of the earlier breeders sought to remedy the defects that some thought apparent in the Ketton stock, notwithstanding the public approval, as shewn by the £151 average, and the 1000 guineas for the six-year-old bull Comet (155). Mr C. Mason, of Chilton, Durham, improved the shoulders of the cattle in his herd, somewhat at the sacrifice of the hind quarters; and Sir Charles Knightley, in more recent years, was also very particular about the fore quarters. During the last quarter of a century, fashion has run high, and there has been a constant adherence on the part of breeders to particular strains of blood, producing different characteristics of the same breed.

The system pursued by the most eminent breeders is that of allying animals of the same strain of blood. One breeder readily sells his bull calves for 500 guineas each, and a calf sold at the close of last year made 1000 guineas. Another lets his bulls for the year at varying rentals, from 100 to 300 guineas each. The most effective method of producing good animals seems that of close breeding, or, as it is termed, in-and-in, so long as robustness, size, and constitution are maintained. Another method is to use bulls of one strain year after year, upon a herd of different blood.

The "Herd Book" has been the mainstay of this carefulness on the part of the breeder. Brought out in 1822, by Mr George Coats in his old age, it was continued by his son, at whose death it was taken up by the present editor, Mr Strafford, by whose persevering labours it has reached its 19th volume, which was published last year with a record of 30,347 numbered bulls, and a proportionate number of cows. More than 700 subscribers and breeders are enumerated in the last volume.

The value attached to the best specimens has of late years become almost fabulous. The late Mr Whitaker, whose sound judgment and modest opinions entitled his observations to the most sincere respect, says, in 1829, that 2000 guineas would not purchase ten of the most select animals in the country. That price now breeders have been known to steadily and calmly decline for one animal. Thus we find pure specimens of bulls and heifers making, even at auctions, 1000 guineas each, and private purchasers have gone as high as 1500 guineas for heifers. The summary of the principal sales held during the year 1871 shews that about 2064 pure-bred shorthorns of all ages have been sold for £115,400, averaging within a trifle of £56 each.

The preponderance of the breed at the meetings of the Royal Agricultural Society of England has been remarkable. The result of seven years, ending in 1852, was 702 shorthorns against 211 Herefords and 357 Devons; and for the last ten years the numbers exhibited have been 1476 shorthorns, 574 Herefords, 472 Devons. At the leading markets and fairs, except perhaps in the south-west, they comprise the majority; and it is estimated that there are more shorthorns bred, fed, and grazed in England than all the other breeds put together.

The great milking properties of this breed have made them equally serviceable to dairymen and graziers, and one of the more recent companies in London started under the name of the Royal Shorthorn Dairy. Years ago it was customary to walk the ordinary unimproved shorthorn from the north to the south of England; farmers would meet the droves on the road, buy the best animals, and in this way many capital stocks have been established in the midland and southern counties. Of late years complaints have been frequently made that shorthorns are not good milkers. This has doubtless been correct in many instances, and has arisen, not from inherent defects, but from the pernicious effects of forcing young animals into a condition of premature fatness. There are, however, animals of all strains, capable not only of making their own calves fat, but of giving several quarts of milk daily in addition.

One great advantage of the shorthorn is its marvellous efficacy in crossing and improving other breeds. In Scotland, many of the native black herds have been crossed generation after generation, until the characteristics of the shorthorn are remarkable. In Wales, the "coloury beast," as the shorthorn is called, is gradually working upon the Castlemartins and Runts, and pure-bred herds are to be found in the south as well as the north of the Principality. The marvellous improvement in the Irish cattle has become proverbial, and so recently as last year a breeder in county Wexford gave 750 guineas for a yearling heifer. Even the Isle of Man boasts its pure herds and a 400-guinea heifer.

But it is to the New World that the greatest importations have been made. America imported pure shorthorns upwards of fifty years ago, and every year numbers of cattle leave our shores for the States. Canada, too, with its fields five months white with snow, finds the purest pay the best; and one energetic Canadian, in 1870, spent £20,000 in importing pure animals, which have been highly remunerative.

New Zealand has also its breeders and importers; and, coming nearer home, we find France took thirty years ago some of our best cattle, and one of her first acts after the late terrible calamity was the importation of four pure-bred shorthorn bulls. In Germany, several pure herds are to be found, and shorthorn bulls have been used among the native breeds of Russia and Bessarabia, and even in Egypt.

GALLOWAY POLLED CATTLE.

THE following article, which appeared in the *Field*, is from the pen of Mr Gilbert Murray, Elvaston, Derby:—

Galloway proper comprises the counties of Wigtown and Kirkcudbright, forming the south-western seaboard of Scotland. Geologically it rests principally on the Silurian rocks of the primary formation, attaining in some parts an elevation of nearly 2000 feet. The uplands are principally devoted to pastoral purposes, to which they are well adapted; the mild humidity of the climate and peculiar nature of the soil tend to produce a luxuriant growth of the coarser kinds of grasses and herbaceous plants, thinly interspersed with patches of heath. The average yearly rainfall is 35 inches.

The cattle, which derive their name from the district they inhabit, are possessed of distinctive and strongly marked characteristics. We learn from authentic sources that so early as the beginning of the sixteenth century they had attained considerable celebrity, which they have successfully maintained to the present day. The Galloway is generally classed with the mountain breeds, though we think he might more appropriately be placed amongst those of the plains. With ordinary keep, the ox, at three years old, will weigh from nine to ten scores per quarter. To persons but slightly acquainted with the breed they are very deceptive, as they weigh heavier in proportion to their size than any other classes of cattle. The hides weigh well, and when well fed the beasts produce internally a large quantity of loose fat. The beef is tender, and has the fat and lean well mixed up together; hence they are held in high estimation both by the butcher and the consumer.

The distinguishing characteristic of the race is the absence of horns, both in the male and female; they are mostly of a black colour, though we occasionally meet with individual animals of unalloyed purity of a red or brown colour; others, again, of equally pure lineage, have white faces, and are marked with white under the belly. The trunk is symmetrical and well formed, supported by short legs; the flesh is evenly distributed over the frame, even down to the knee and hock; the shoulders are thrown well back, which gives breadth to the chine, and depth and expansion to the chest; the sides are long, ribs well sprung; the hips round, and less prominent than in some of the improved races; the skin, though thick, is mellow to the touch, and covered with a profusion of long silky hair.

Down to the first decade of the present century, the Galloway was by far the most numerous and important breed of cattle in habiting the wide pastoral range, stretching from the River Tweed on the east to the Irish Channel on the south-west. At the same date they were the principal breed cultivated in Carrick, the south-western division of Ayrshire. Long prior to the date of railways, and before artificial manures were known and appreciated (which gave an impetus to the cultivation of root crops), a large and impor tant cattle trade was carried on in the south. Some idea may be formed of its magnitude at the period of which we write, from the fact that, taking Dumfries as the great mart and principal centre from which the southern droves took their departure, from this one point alone there passed yearly from 25,000 to 30,000 head to be finished off on the rich pastures of Leicestershire or Northampton, or the salt marshes of the eastern counties. Several weeks were occupied on the journey; the drovers being well acquainted with the country they traversed, in order to save turnpikes and the feet of the animals, and at the same time snatch a morsel of food, preferred the devious windings of the cross-country lanes to the more direct lines of the turnpike. There were likewise a goodly number fattened off on the rich pastures of Milton, Howwell, and Baldoon, in Wigtownshire, and on the sheltered and productive lowlands of Dumfriesshire.

One of the distinguishing features of the breed, the absence of horns, has by some been attributed to the physical conditions by which they were surrounded. The practical man who has closely studied the different races of our domesticated animals well knows that soil and climate produce wonderful effects in altering their appearance. This, and a careful selection of males and females of approved type through many generations, could not fail to stamp the race with a distinct character.

The polled breed of the eastern counties of England, which is now attaining such well-merited repute, raises a lingering suspicion in the mind, strengthened by the fact of long-continued and extensive importations of Galloway cattle into those districts, that at some distant period it derived its origin from that source. It is true that the colour is distinct, but any person wishing to improve or establish a race of a red colour would have experienced no difficulty in selecting pure-bred animals of that colour to start with. There is still a striking resemblance in some points between the two races, more particularly in the formation of the head; and it is clearly within the range of probability that the existing difference of appearance may have arisen from the effects of soil and climatic influences.

Down to within the last forty years, large numbers of cattle were bred in Ireland bearing a close resemblance to the native Galloway, with the exception of horns, which the greater portion of the Irish bred animals possessed. As many as 10,000 of these were yearly landed at Portpatrick, a small seaport on the south-western promontory of Wigtownshire, at a period antecedent to that at which the harbour was made available for the admission of loaded vessels of from 60 to 100 hundred tons burden. The practice was then to let go the anchor as near to the shore as the depth of water would permit without endangering the safety of the ship, and then to sling the cattle into the sea and swim them ashore. With a rough tempestuous coast this often proved a hazardous, and not unfrequently a disastrous undertak ing; at all times it required the service of several well-manned small boats to guide them ashore, for if left entirely to themselves they were as likely to swim out to sea as they were to make for the land. The greater part of the cattle landed here were from one to two years old. As soon as they were sufficiently rested, they were driven on to some market or fair. Nearly all fresh arrivals were pitched at Stranraer, that being the nearest market to the port of disembarkation, and at that time the great mart for Irish cattle in Scotland, and was regularly attended by graziers from long distances. In those days, and down to a much later date, the father of the writer was constantly in the habit of riding on horseback out of Ayrshire, a distance of 30 miles, to attend this market, returning home the same night. The great object of the purchaser was to select those most nearly resembling the native Galloway. As already stated, great numbers were possessed of horns; some were very small and loose to the touch, appearing to be only attached to the skin, whilst many were of a fixed and more prominent character. The matter of horns was considered of minor importance compared with that of hair and colour, and the closeness in general *contour* with which they approached the approved type. In order to obviate the difficulty and remove the objectionable appearance, the Irish breeders and cattle dealers had recourse to the following stratagem:—the animal was cast in the usual way, and when properly secured a sharp knife was passed round the base of the horn, severing the skin and the fleshy part; a fine toothed handsaw was then inserted into the incision, and the horn and pith cleanly sawn off level with the skull. To prevent hæmorrhage, the protruding ends of the arteries were either secured by a needle and fine silk, or else they were seared with a hot iron. A circular patch of linen, corresponding in size to the base of the horn, was dipped in moderately hot tar or pitch, and placed on the wound; three thicknesses of this were generally used, and stitched round the edges to the hair, to prevent them peeling off before the wound had healed up. This was undoubtedly a cruel operation yet, when skilfully performed, we believe it was seldom attended with fatal results. It is only fair to state that the operation was only performed on those animals more nearly resembling the native Galloway. At that time many of the Irish-bred cattle had a line of white or ashy brown along the ridge of the back; nothing could be gained from removing the horns of such, as the merest tyro could at once recognize their lineage.

It has been asserted by some that the Galloway breed was greatly deteriorated from its having been crossed with the Irish. This we believe to be a fallacy, as the Galloway breeders had always a strong aversion, I may say hatred, to the Irish; the prices obtained for the pure-bred Galloways would of themselves be sufficient to deter them from adopting such a course. These cattle, when from one to two years old, would be of the average value of £4 to £9 per head, and always realized from £1 to £2 per head above the Irish of corresponding size and age.

Galloway cows have the character of being bad milkers, due in great measure to mismanagement. The old breeders invariably allowed the calves to suck their dams, depending more on the amount realized by the stock reared than they did upon that obtained by the produce of the dairy. Farmers possessing tolerably large herds were content if they could only obtain sufficient milk to supply the wants of their family, and furnish them with butter and a small quantity of skim-milk cheese. We have frequently seen the maid milking on the one side of the cow, whilst the calf was sucking on the other. During the summer and autumn they were generally milked out-of-doors in the open yard. When the calf had reached the age of five or six months, it was usual to place a muzzle on the nose; this muzzle was simply a head stall, the nose piece of which was a broad band armed with sharp spikes, the motive of which was to set the cow kicking whenever he attempted to suck, and therefore defeat his object; at milking times the muzzle was removed, and the milkmaid and calf started on equal terms. When the milk became exhausted before the appetite of the calf was appeased, it became rampageous ot unfrequently charged and overthrew ilkmaid and her pail. The cows and calves were never separated, and, ex- n cases where the means of restraint used which we have related they had access to their dams at all seasons. practical man well knows the deterio- effects such treatment would produce e most prolific milker.

ien regularly milked in the usual way we hem little inferior to many of the other lished breeds, and the milk is invariably n butter. It has been noticed in highly ated cattle that the calf's sucking the prevents the latter becoming again in whereas in animals less improved it ap- to exercise but little effect, as the Gallo- as a rule were regular breeders.

cross has been tried between the native way and several other established ls. That which is viewed with most r by practical men is the cross between ure Galloway bull and Ayrshire cow; they have the reputation of being kindly feeders, arrive early at maturity, and attain a profitable size. The prepotency of the male has recently been freely discussed; we think none of the native races are equal to the Galloway in this respect. Put a well-descended Galloway bull to a herd of Ayrshire cows, and every calf will come black without an exception; but put the purest bred shorthorn bull which it is possible to obtain to a herd of Galloway cows, and the calves will be dropped of all imaginable colours. A good many will be black, some black and white, and a large number of a bluish-grey colour. At the present moment I have a pure-bred Galloway cow, which was put to a purely descended white shorthorn bull, bred by Lord Zetland; the produce was a bull, which of course was castrated. He is now fourteen months old, is entirely black, and possesses all the characteristics of the Galloway, but very few persons would believe that he was in any respect related to a shorthorn.

TRANSIT OF STOCK.

MEETING of the Farmers' Club was held on Monday, 4th March, at the bury Hotel, Salisbury Square, Fleet t—Mr Cheffins, the president, occupy- the chair. There was a fair attend- of members. The subject for the ing's discussion was "The Transit of Stock," which was introduced by Mr A. h, Southall, in the following paper :—

he subject we have to consider this ing is the transit of live stock. It is a ect of great importance, and one in which only the members of this Club, repre- atives of the farming interest, but also the ic generally, have taken a deep interest, it still receives its share of the interest hing to other problems which it is desir- to have solved. The Highland and cultural Society are pressing the Execu- for increased accommodation for the watering of cattle. In the *Farmers' Magazine* for January 1872, I read the following, under the head "Highland and Agricultural Society of Scotland:"—The report by the Committee on the Transit of Animals by Railway was submitted. It embodies the whole proceedings of the Society from the time the subject was first taken up by the directors in 1867, and proceeds as follows: —After carefully considering the documents submitted, and the Act to which the Order of Council has reference, the committee beg to recommend that the Board should again communicate with the Lords of the Privy Council, through Dr Alexander Williams, specially pointing out—I. That the Order of Council (300) called "The Transit of Animals Order of May 1870," for providing trucks with spring buffers and supplying water to animals carried by railway, is not only systematically evaded, but is defective in respect that provision is not made for supplying animals with food; and that a new Order of Council is urgently called for. In the new Order it should be specially provided—(1) That animals should be supplied with water when trucked and untrucked; and during the journey both with food and water. The necessary food to be provided by the owner of the animals, the water by the railway company. The Act says that if animals are allowed to be in trucks without water for a period between twelve and thirty hours (to be fixed by the Privy Council), the railway company will be guilty of an offence. A rule of the same kind should be adopted for food, against the owners. (2) That in addition to the spring buffers stated in the Order of Council (300), it is absolutely necessary to provide covered waggons, closed at the ends, and 18 inches along the sides from each end, with an arrangement of troughs for the proper supply of the animals with water, and racks for supplying hay in the trucks during the journey. II. That many important railway stations where animals are trucked and untrucked and not included in the schedule attached to the Order of Council (324) called "The Transit of Animal (Water) Order of March 1871." The committee further suggest that should the Privy Council not give effect to the representations proposed to be made to them, an influential deputation should be formed to wait on their Lordships. The February number of the same magazine contains the reply of the Privy Council, to the effect that any specific case of evasion of the law, if reported would receive attention; also that no means which the Privy Council would feel justified in enforcing had been suggested for the supply of water to animals during transit. I may add that a veterinary congress is now assembled at Vienna to take into consideration the whole subject of the transit of live stock.

LOSS CAUSED BY DEFECTIVE RAILWAY TRANSMISSION.

For my part I think it a proposition, which cannot be controverted, that great advantages would be afforded to stock-owners and to the community generally, by adopting an improved and a more humane system for the transit of our neat stock, our horses, and our sheep. Indeed, a marked improvement in the condition of our stock brought to market has already resulted from public opinion pressing upon the Legislature and the Executive Government better regulations for the transit of animals by land and by sea; and improvements may certainly be carried further. In treating of the transit of live stock and subjects pertaining to it, I shall not forget that I am addressing practical men who are well acquainted with them, and I shall not pile up a mass of figures to shew the magnitude of the traffic. I will merely mention that 60,000 head of cattle were landed at the Norwich station of the Great Eastern Railway alone, during the last autumn months. Traffic quite as extensive is going on at numerous stations over the length and breadth of the land. I have long taken a great interest in, and I have been at considerable pains in endeavouring to improve the means for the conveyance of our cattle; and the present seemed to me a favourable time for a fresh survey of the whole subject of transit of live stock—a time to reckon up how much improvements had been made in respect of it, and to see to what extent the needs of the cattle as regards their being supplied with food and water and shelter and other comforts, had been provided for. I remember, when fat cattle were driven up by the road, it was estimated that in a journey of 100 miles, bullocks lost each 10 stone, and sheep 1 stone. The consigners of cattle from Scotland to the London market now estimate the loss in weight of the cattle from the journey at from 4 to 6 stones each. A gentleman of great experience and practical knowledge, who gave his evidence before the committee appointed by the Lord President of the Privy Council to investigate this subject of transit, gave it as his opinion that cattle lose 8 lb. per day per head from the day they leave the graziers' yard. The following is from the minutes of evidence published with the Report of the

tee of Privy Council, p. 15, No. 316 :
s my firm opinion that every bullock,
e moment it leaves its grazier's yard,
e 8 lb. a-day in weight, beside loose
is beyond all description—the loss.
w people understand it; it has been
ant cause of contention between the
in the country and the butchers in
n. If I have any number of beasts
from yesterday's market, when I bring
nto the market again, they have lost
uch indeed; they lose everything, and
course of two or three weeks will be
at death's door." This has reference
le under the ordinary conditions of
cattle which we may presume are
cared for than other cattle, and which
irly be supposed to receive the utmost
on that can be given to their needs.

T OF AGRICULTURAL SOCIETIES ON THE SUBJECT.

ive taken the weights of the same
weighed for the last Birmingham
and weighed afterwards for the Smith-
lub Cattle Show, and the forty beasts
total gain of 10 stones 1 lb. Now
ld put it to the meeting—is not the
transit of cattle a matter of national
n the department of agriculture, which
oyal Society, and the other grand socie-
ich have reached almost equal import-
would do well to investigate? The
t of the Committee of Council recom-
s to the Privy Council, "That further
ments should be made to ascertain
or what combination of which, of the
proposed of feeding and watering it
be most advantageous to adopt; and
hat it should be imperative upon all
s of animals, when the distance tra-
is 200 miles or upwards, to provide
and water for the animals so carried,
see that such food and water is offered
animals." Could not these societies
arrangements for the weighing of
ls at their starting from their homes for
rious shows, and for the weighing of
when received into the show-yard,
g into account also the food and water the beasts have consumed during the journey? Is there any reason why they should not offer prizes for the best adapted cattle-trucks —trucks which would carry cattle in the most advantageous manner for the profit of stock-owners and the consumers of meat? Are not such vehicles or machines devoted to agricultural produce of as much importance as carts and waggons for the conveyance of corn and other produce to market, and as much or more worthy of attracting mechanical ingenuity and practical knowledge in relation to the functions, habits, and acquirements of cattle, so as to get them built in the most appropriate manner? I look upon this Club as especially the eye to see to the farming interest, and the brain to devise measures for its complete development. The action taken by our Club in the transit of live stock has done much to guide public opinion upon it, and to advance sound views as respects the Government regulations; and I think it will not be uninteresting, or a waste of time, if I briefly refer to former proceedings of the Club on this subject. So long ago as February 1868, the question was most ably brought before you by the member for South Norfolk: "At Norwich station I have frequently seen cattle at nine or ten on Saturday morning, and they remain there until two, three, and four o'clock in the afternoon. (A voice: 'Six o'clock.') Well, I have seen them at four. Notwithstanding the immense import of stock into Norwich, there is not a single drop of water at that station for cattle. It is said that there is a river within 300 yards of the station. Why, in like manner it may be said that there are plenty of bakers' shops at the east-end of London, but the people do not all get as much bread as they want. I trust that now that the chairman of the Eastern Counties' Railway is a nobleman of great ability and a man of business, that defect at all events will be remedied. At present the cattle remain without food or water till Sunday morning, and at ten or eleven o'clock they are placed in the lairs, of course in a fit condition for contracting any disease. The distance from Aberdeen to London is 550 miles. Mr Tegg, the inspector of cattle at the Metropolitan

market, stated, in 1864, that cattle conveyed by the railway companies from Scotland leave there on Thursday, and do not get to the lairs of the Metropolitan Cattle Market until Saturday, and he has every reason to believe that they have neither food nor water during the transit; and if there were any predisposing causes of disease, this cruel treatment may well induce its appearance. Of course there is here more harm to the consumer than to the buyer. The animals are killed too soon to produce actual disease, but the meat must be less wholesome. Consumers in London talk a great deal about the bad quality of the meat which is grazed, and the amount of oil-cake and other artificial foods used in fattening animals; but I believe that what I have mentioned has more to do with the defects in question than anything else. Now, in the case of store-stock transit, all these miseries are, of course, augmented. Store stock cannot stand heat, cold, and fasting, so well as old fat cattle."

RECOMMENDATIONS RESPECTING THE WATERING OF CATTLE ON RAILWAYS.

You have thus a statement of the condition of transit at that time. Looking "on that picture and on this"—the state of things under Act of 1869, and that under the Orders of May 1870 and December 1871—looking at the cleansed and disinfected cattle trucks, some of them roofed over, and all constructed with spring buffers, and the water troughs, such as they are at many stations, we wonder how it could possibly have happened, under our popular constitution, with free liberty of speech and a Parliament full of farmers' friends, that such obvious and simple contrivances for the barest requirements of the cattle traffic could have so long been neglected. And "still the wonder grows," that the very obvious regulations recommended in the Report of the Committee appointed by the Privy Council have not yet been enforced. I think you will be of opinion that the powers given to the Privy Council under the Act of 1869 have not been enforced to the extent that they might be. We are so conservative in this old England that only a great catastrophe, a national calamity, can move us out of the beaten track of an old procedure, and the fearful visitation of the cattle-plague, by arresting public attention and turning it to consider the means of a better transit for our cattle, induced the Government to bring forward measures resulting in the Act of 1869—the Cattle's Magna Charta. With respect to the watering of cattle during transit, what was your (the Farmers' Club) recommendation in the letter you sent to the Privy Council? It was that cattle should be watered every twelve hours. The Central Chamber of Agriculture recommended twelve hours; the Cheshire Chamber twelve hours; the Cornwall Chamber twelve hours in winter and ten in summer; the North Riding of Yorkshire Chamber twelve hours; Scottish Chamber twelve hours, and the same period afterwards. (There is a demurrer to this from Mr Wm. M'Combie, M.P., at page 77 of the appendix to the Report of the Privy Council Committee); the West Riding of Yorkshire also recommended twelve hours; the Worcestershire Chamber twelve; the Midland Club twelve; the Penrith Club six or eight; Mr Wm. Torr eight hours; and Professor Hugh Ferguson twice a-day. The Privy Council have not fixed less than thirty hours for first watering, as opposed to the remarkable unanimity of the foregoing opinions. I must not omit to allude to those of a body of gentlemen composing the Royal Agricultural Society, and endorsed by the chairman, the member for Aberdeenshire, Mr M'Combie, for whom we must feel the highest respect, and to whose opinion, and those of his colleagues, we would willingly shew great deference. I would always well weigh the advice of observant practical men; but when there is a conflict of opinion among them, it is well to consider the opinion of men of science. What says Professor Simmonds upon the point? "There cannot be a doubt that the feeding and watering of animals on their journey to a fat cattle market would prevent, to a certain extent, that waste of tissue which invariably takes place in the travelling of cattle, and would also tend to maintain uicy' and well known superior quality meat which is met with in animals when at home. From a humane point of also, it is exceedingly desirable that ls should have both food and water on ourneys, the latter being especially re- . during the heat of summer." Now, k I can refer to the opinion of a prac- man fully corroborative of the Pro- 's observations as to waste of tissue. ys :—"There is occasionally a want of *reshness* that we see in the beasts that a shorter distance."

DING ANIMALS IN TRANSIT: IMPROVED TRUCKS.

railway transit the Privy Council have no Order for animals to be *fed*, except e requirement of the owner, under the of 1869, section 64. As to food, you not sure food was desirable. Science is st you. I would remark that to keep cattle thrifty you feed them three times elve hours during the day, and you fill acks well at night that they may not before morning; you then send them for a thirty or it may be a forty hours' ey without food. And I would again refer to the comparison of weights of the s exhibited at the Birmingham and Lon- shows, as proving how care and food ustain cattle in travelling. You recom- led a more speedy transit. There is a ct unanimity upon the advantage of this e cattle. Mr William Torr says: "The objection now is to trucks with cast- wheels going on with passenger trains; e wheels of the cattle trucks were made wrought-iron, the same as passenger s, they would pass along with passenger s, and I think it is very shortsighted omy in railways, where there are not cattle-trucks, not having them on ght-iron." The Committee say in report:—"Having cast-iron wheels in- of wrought-iron, they are not, as a rule, itted to be sent by passenger, *i.e.*, by the st trains." As to spring buffers, they now universally provided. There is agreement not to have cattle unloaded during the journey. But unless the hay and the water are carried in the truck with the beasts, or there are proper sidings and carriages adapted to the sidings, how are the animals to be refreshed? Such provision is not yet made, nor is it ordered.

SEPARATING THE CATTLE: SPRINGS USED ON CATTLE TRUCKS.

We now arrive at an important recommendation for our consideration; it is the dividing trucks into compartments. I think there can be no question as to the great advantage of this for fat cattle. But I do not find in the report of the Privy Council Committee that that subject was at all entertained by them, notwithstanding that the matter was urged on the committee by the Cheshire Chamber, the Devon Chamber, the Midland Chamber, the Penrith Club, and the Farmers' Club. Much deterioration would be prevented from bruises by this means. It would allow of the sorting of cattle, and would give them a better opportunity to lie down and rest on the journey. None of the carriages are so constructed, nor is there any order to enforce it, although there is great testimony to the advantages that must accrue. In my own letter of recommendation to the committee I have advised the supplying of more elastic springs to the cattle trucks, which I consider a point of great importance. I there say:—"A quicker transit, more elastic buffers, and springs, preventing the constant wearing tremor through the frames of the cattle, would contribute much to their ease." Possibly it may have been the fate once in the lives of some present—if not, I should recommend them to try it—to ride at a trot in a cart without springs, or with springs constructed for a ton weight. In such a position you are able to realize the dreadful position of the poor cattle standing on ribbed floors, hurried along at 15 or 20 miles an hour in carriages with springs stiff enough to carry treble their weight. This is the cause of the break-down of many a young ox, and I would venture to ask members of the veterinary or medical profession what must be the effect on the nervous system of this violent shaking. On this point the committee say in their report:—"The jolting and severe shaking now often experienced by the animals, by which it appears, in the evidence, that much pain and damage is often inflicted." The following are, I have ascertained, the dimensions of some of the springs of railway carriages:—First and second-class passenger carriages, length 6 feet, twelve leaves each, 3-8ths of an inch thick, width 3 inches; truck registered to carry 8 tons, length 3 feet 6 inches, twelve leaves each, 3-8ths of an inch thick, width 3 inches; truck registered to carry 9 tons, length 3 feet 6 inches, ten leaves each, 3-8ths of an inch thick, width 4 inches; cattle truck, length 3 feet 6 inches, twelve leaves, 3-8ths of an inch thick, width 3 inches. Average weight of stalled cattle alive, say 140 stones of 8 lb., or half a-ton each. Thus the trucks for cattle, which are never weighted with a load of more than 4 tons, have springs equal to the carriage of 8 or 10 tons. A supply of sawdust or tanner's bark kept at the stations to strew over the floors of the cattle trucks would conduce very much to the comfort of the cattle, and help them through long journeys in standing up and also in lying down. Ribbed floors are very necessary for foothold, but without saw-dust they are extremely wearying and painful for the beasts to stand upon. Tarpaulins and other conveniences are supplied for merchandise. Is there any reason why the necessary conveniences should not be supplied for cattle as well? At present the provender for cattle is protected better than the cattle themselves.

SEA TRANSIT: NECESSITY OF REFORM.

In the transit of animals by sea the difficulties are greater than by land, because we have to contend with a power compared with which all our efforts must be feebleness itself. With a fair wind and a moderate sea, cattle come to hand better by the well-ventilated and properly-fitted ship than they do by railway. The Privy Council have a difficulty in dealing with vessels, because some are not under the British flag, and carry cattle as occasional cargo only. On a full consideration of the subject in all its bearings, I think we are fully warranted in requesting the Privy Council to put in action the power with which sections 64 and 75 of the Contagious Diseases (Animals) Act of 1869 has invested them, the immediate object being that every cattle-truck should be roofed over to protect cattle from the sun, as well as from the rain and snow; that the trucks should be surveyed and branded, to denote their fitness of construction; that they should be run on wrought-iron wheels, and furnished with springs suited to the weight they have to carry, and that they should be partitioned transversely across the centre; also, that a supply of sawdust, or tanners' bark, should be kept at all stations for strewing the floors of the cattle-trucks, and that the water-troughs at the stations should be made of suitable dimensions for the traffic. I think it is very desirable also that we should endeavour to persuade our great agricultural societies to undertake experiments in weighing cattle sent by rail, and to grant prizes for trucks best adapted for the traffic. In touching this important subject I have not given you an hypothesis merely, I have given you facts. You have my reasons for all I have advanced, substantiated by recognized authority; and, in the main, I have dealt with the question, and laid it before you this evening in its commercial bearings only. But there is another aspect of it enlisting the public sympathies in which it must also be viewed. Not in this room, and I trust, in no other assemblage of British farmers, will considerations of humanity be set aside or disregarded. We cannot ignore the sympathies of a common origin. The mere materialist in his researches in physical science perceives this, and in the words of an eloquent professor, we are all children of the sun. In our own construction and the construction of lower animal life there is a similarity of combination; but more—there is a mystery involved also. The lower animals are placed under our dominion, and we incorporate and assimilate their constituents in our own.

THE VALUE OF AGRICULTURAL CHEMISTRY.

HE following is a lecture delivered by
the Rev. J. Smith, B.D., at Newhills,
deenshire. Mr Smith, responding to
rish of several farmers of the parish, that
rould give a course of instruction on
ultural chemistry, has, for the last few
ths been delivering lectures weekly be-
well-attended meetings of agriculturists.
the conclusion of the course Mr Smith
:—

onsidering the season of the year, we
found it advisable to make our reading
conversation converge as much as pos-
to the subject of manures. When our
se commenced, ammonia was selling at
per ton, being a rise of £8 to £10
e the previous season. At the present
nent, this indispensable substance is
ed at something like £100 per ton, or
it 1s. per lb. This fact must surely be
e powerful than any words in enforcing
adoption of the best methods of retaining
nitrogen of our manure heaps, preventing
scape by evaporation or drainage, and in
ving the importance of not allowing a
of waste liquid from dwellings and
es to be lost. The rapid increase in the
of ammonia may be expected to stimu-
the spouting of premises, the formation
nks, the making of the bottom and sides
dung courts impervious, and similar
hanical improvements. And these would
not merely agricultural but also sanitary
rovements, which, if generally adopted,
ht help to ward off typhoid fever,
heria, and other diseases from farmsteads
re, strange to say, they are but too
mon. The enormous price of a main
edient of manures may contribute more
anything else could possibly do to pro-
e such studies as we have been engaged
nd so to intellectualize the agricultural
d—an appeal to the pocket being generally
e efficacious than verbal advice. The former must have ammonia, and generally a great deal more ammonia than can be produced on the farm; and when this substance costs 1s. per lb., it is surely of immense pecuniary interest to him to ascertain what quantity of ammonia will be most remunerative in his circumstances, and in what form he can purchase it most cheaply. Now, how is he to satisfy himself on these points? Take, for example, the turnip crop, on which, I believe most of you, gentlemen, are in the habit of bestowing £2 to £3 worth of fertilizers per acre over and above a dressing of farm-yard. Well, the manufacturers prepare a turnip manure, and doubtless these special mixtures are often compounded with great anxiety and skill to meet the requirements of the plant. But the experiments conducted under the superintendence of Dr Voelcker, and reported in a late number of the *Journal* of the Royal Agricultural Society, concur with many former experiments in shewing conclusively that the same turnip manure produces very different effects on different soils. And this is just what might have been expected when we consider how soils differ, both as regards the proportion of organic and inorganic matter, and also with respect to the constituents of the inorganic matter. Thus the very nature of things renders it impossible to compound a turnip manure that shall be at once effective and economical in different soils. Without going beyond our own parish, it would be very surprising indeed if the mixture that proved most remunerative on Clinterty should also prove most remunerative on Oldmill. And it is gratifying to learn on reliable evidence that a moderate dose of a fertilizer may in some circumstances be more profitable than a heavy dose; for in the experiments of the Cirencester Chamber of Agriculture, as just reported upon by Professor Wrightson, 3 cwt. superphosphate per acre for swedes was found more profitable than 6

cwt., a result which is the more remarkable that soluble phosphate is the specific for the turnip crop.

THE ELEMENTS OF TURNIP MANURES.

Theory and practice agree that the leading element in a turnip manure should be phosphate of lime partly soluble and partly undissolved; but it is an open question to what extent ammonia should be introduced, and what are the circumstances that should regulate its introduction. Looking at the crops that used to be obtained by means of Peruvian guano, one would be disposed to say that the turnip manures offered in the market are deficient in ammonia, 1 to 3 per cent. being the common amount, while Peruvian guano used to contain 16 to 17 per cent. It is, if one may say so, a still more open question whether a turnip manure should contain potash, for nothing can be more perplexing than the present state of enlightened opinion regarding the manurial value of this substance. On the one hand, we have Mr Lawes, the foremost farmer of the age, and a large maker of salts of potash, decrying their use, and stating as the result of prolonged experiment that it is only in isolated cases they will pay the cost of application. On the other hand, we have Dr Voelcker, the foremost agricultural chemist of the age, concluding his most recent report of the field experiments thus :—"It will be found that in every trial in which potash salts were applied to root-crops, either alone or in conjunction with other fertilizing matters, they materially increased the crops. And he predicts a more abundant use of these salts, especially on light land. I have little doubt the divergence of opinion on the part of these eminent authorities is to be explained by the diverse requirements of soils, differing so widely, as fertile clays and light soils tending to sand. Now, in this extreme parish, which contains a good deal of light soil, and from which, in consequence of proximity to Aberdeen, crops containing much potash, such as potatoes, hay, green clover, and turnips, are constantly being removed, the question as to the possible exhaustion of the natural store of potash derived from the decay of the granite is of the gravest import, and, as bearing on this question, some of you are aware of how one of my little fields shewed its gratitude for a dressing of salts of potash last year. Well now, if any of us were going to mix a turnip manure for our own use, our object being to obtain maximum efficiency at minimum cost, we need have no hesitation in drawing a skeleton, thus:—

Turnip Manure
- Ammonia (or a Nitrate).
- Phosphate of Lime.
  - Soluble from mineral.
  - Undissolved or partly dissolved bone.
- Potash.

Nor need we have much difficulty with the middle term, phosphate, for against soluble phosphate most of us would at once write 2 or 3 cwt. superphosphate, and against undissolved phosphate 2 to 4 bushels bones. But as to the figures to be set against ammonia and potash, or whether we may exclude potash altogether, I know not how any of us can determine these important matters except by theoretical consideration on the one hand and experiments in our own fields on the other. And in order to this we have need to cultivate a scientific turn of mind, and to know somewhat of the chemistry of the plant, the chemistry of the soil, and the chemistry of manures.

FARMERS' CLUBS.

In taking up the topic of agricultural education, one's thoughts at once turn to farmers' clubs, institutions which may be said to have sprung from the Board of Agriculture (incorporated, 1793; dissolved, 1816), and which have multiplied exceedingly during the last thirty years. No one doubts that these societies have given an immense stimulus, and afforded considerable guidance to agricultural progress. Probably, it would be difficult to overstate the share they have had in introducing and popularizing improvements on implements, seeds, roots, and breeds. But in the departments of manures and feeding stuffs, two momentous departments of farm practice, local societies have

most nothing by way either of stimu-
guidance to local practice, while the
entral societies are as yet only elabo-
he most general principles, which, in
o be practically useful, need a further
tion in view of local circumstances.
what is the cause of the barrenness of
ocieties in these respects, and the
ness of the central societies in so far
y have borne fruit? Whatever has
ccomplished, has been done with the
nce of chemistry, by means of chemi-
mmittees, advised by such men as
son and Voelcker, and by the indi-
researches and field-experiments, and
periments of such men as Mr Lawes.
rt, the great societies have been fruit-
cause they have invoked the aid of
e, and the local societies have been
because they have not done so.

yet it is not much that is wanted to
our local societies fruitful, as fruitful
ir kind as the great central societies
nd very helpful to the fruitfulness of the
ocieties themselves. We only require
losely observed, accurately reported,
asoned upon correctly, in view of what
ady received either as certain or pro-
And what is wanted in order to this
what we saw to be needed by the
when he goes into the manure-market
cientific turn of mind, and some
ntance with the chemistry of plants,
and manures, to which we may now
ne chemistry of cattle food and a
nimal physiology.

DIFFUSION OF AGRICULTURAL SCIENCE.

l, now, assuming the imperative desir-
of so much science as I have indicated,
actical question arises, how is it to be
d through the mass of farmers? Or,
ess ambitious, how is a beginning to
de in this great undertaking? How
little leaven be introduced so as to
no distant date to the leavening of the
lump? It is proverbially easier to ask
ns than to answer them; and, doubt-
ception will be taken to any answers
n possibly be returned to such questions as these, for the matter has two attributes that tend to mystification and difference of opinion—greatness and novelty. But, perhaps, as a person who has had some little experience in education, both elementary and advanced, I may be permitted. I need hardly tell you, especially those who have attended our weekly meetings, that there exists some special facilities for the diffusion of agricultural science. No subject I have ever dipped into is blessed with better elementary text-books, and the framers of school-books, whose name is legion, as parents unhappily know to their cost, might gather some useful hints from the treatises on agricultural chemistry. These admirable little works are not the compilations of book-wrights, for the subject has not yet fallen into that gutter: they are choice morsels of exposition by masters of the science, and the names of Johnston, Sibson, and Cameron, are guarantees of first-rate matter expressed in a simple and interesting manner. Again, there seems to be growing up a desire for such knowledge. If we may judge other communities by ourselves, and, I suppose, we are just a fair average specimen, this desire is beginning to be felt by farmers of every class, from the largest to the smallest, but, of course, it is realized differently by different persons, some having an intelligent apprehension of it, others experiencing only a vague sense of want. Nor can we doubt that under the two-fold pressure of the mystery of manures, and the mystery of cattle-disease, the agricultural mind will ere long be possessed with a consuming desire to understand as far as possible the principles that underlie the arts of husbandry. And our question may be narrowed to this—What can be done in the meantime to gratify and promote this desire? It humbly appears to me that what we most need at present is a local teacher here and there to open the elements of the subject to knots of inquisitve farmers and intelligent labourers. And probably no existing body could do so much to call forth local teachers as the Department of Science and Art, if it were to introduce agricultural science into its scheme of technical education,

and for a short time pay somewhat liberally for results. Science classes seem to be rather going down in Scotland. I would venture to suggest that the Science Department is too much of a mechanic's institute for an agricultural people like the Scotch. Let the Lords of the Council who rule at Kensington, and have so much public money to administer, look away for a little from the skilled mechanic, and consider the case of the crofter groping his way in the midst of tremendous natural forces he knows not the rationale of, although they are ready to crush him at any moment he may conflict with them, while every mistake he falls into is not only an injury to himself, but a loss to the nation. It is surely a marvellous thing that a Government department, which is maintained for the express purpose of teaching artizans to pursue their several arts in a scientific spirit, should ignore and neglect the oldest, and in some senses the most important and permanently useful of the national arts. Let us hope that the Department of Science will avail itself of the golden opportunity afforded by the awaking curiosity of the agricultural mind at once to promote the intelligence of a large section of the population, and to help in augmenting our home food supply. Considering what has been done for the mechanic, and that nothing whatever has been done for the tiller of the soil, the proposal I am making is so fair and reasonable that I should think it would require but a little agitation on the part of the agricultural societies, and but little personal influence on the part of some of our public spirited noblemen and M.P.'s to have it carried into effect.

THE LABOURER AND HIS RELATION TO AGRICULTURE.

By Dr MONCKTON.*

HE had just been reading some letters in the *Times* and other journals, discussing the state of the farm labourer in a tone not complimentary to employers; containing, as was too common, an implied assumption that the farm labourer belonged to an oppressed or neglected race; that he was, from a civilization point of view, a benighted outcast. While admitting at once that the character and condition of the labourer required anxious efforts for improvement, he must affirm at starting that the town dwellers and the city newspapers had not the feeblest title to plume themselves on the superior condition of their own working population.

THE TOWN AND THE COUNTRY LABOURER COMPARED.

Taking England throughout it was probably true that the country labourer was more cleanly, moral, healthy, and happy than his fellow of the towns; within his own not very narrow experience, certainly and positively this was the case. The labourer's dwelling, so much and often so deservedly abused, was healthier in the country than in the towns; was less overcrowded, and less animalized; the cottages themselves had been greatly multiplied and improved during the last generation, and their situations in an ocean of fresh air instead of a dense dark alley, gave them an advantage that it was not possible to overrate, and one that was carried still further by the muscular and out-of-door life that the people pursued. In estimating the condition to which any class had attained, it would never do to judge solely by the number of shillings earned per week. Hard and plain observation at the hospital among other places, had convinced him (Dr Monck,ton) that more outward evidence of squalor- of unhealthy disquiet, and of general wear-and-tear was to be seen among the lower town classes than among the rustic labourers; and

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* Read before the Maidstone Farmers' Club.

e former were followed to their
s, those homes were not only, in many
, dirtier, darker, and closer than the
ry cottage, but far more oppressively
led with lodgers and alien occupants;
ularly might this be seen in London
the very large manufacturing towns.
er was it correct to adopt a certain sort
telligence or smartness as sufficient
nce of class superiority. Agriculture
ated, while commerce aggregated its
es ; the former state rendered men
rn and undemonstrative, the latter
oted a flashy sharpness, and it could
at all be conceded as certain
such sharpening was wholly for the
of the individual or the community.
em compare for a moment the monkey
he sheep, and it would be seen at once
estless energy might be combined with
ess and mischief, while stolidity was
compatible with peace to the individual
enefit to the world. He (Dr Monck-
vas certainly inclined to go in for the
.

must also be remembered that the
labourer was affected in the circum-
and seeming of his life, by the fact
everything agricultural was lightly
ed with cash. The landlord took
er cent. per annum from his land,
d of 10 per cent. as from commerce.
a tenant-farmer in the kingdom failed
20s. a-week in cash, after his lodging
me of his food had been provided by
rm—all the sons of the soil looked to
nd enjoy, under conditions which the
nd the country furnished, and into the
re of which, cash and luxuries only
d to a very partial extent. How many,
stance, of the middle classes, could
healthier, happier, brighter life in the
y on £700 a-year, than £1400 would
and in the towns? No politician,
or social philosopher is justified in
sting the two classes of artizans with-
cognizing that in a certain, but not
idious sense, the farmers work with the
m.

THE CONDITION OF THE RURAL LABOURER IS PROGRESSIVE.

It is perfectly natural and fitting that the higher pay and inducements of the town should tempt away the smarter lads from the sickle and the plough, and the regular supply of such precious material should be credited to the land at a high figure in the ledger of the State; but it is neither natural nor fitting that, having abstracted for their own purposes the most enterprising members of the labouring classes, the remainder should be expected to cut an equally distinguished figure. Neither, in a consideration of this matter, must it be forgotten that, whatever the condition of the labourer may be, it is not stagnant but progressive. In education, wages, dwelling-house, and independence he is, by the operation of natural causes, rapidly and steadily improving. He is in the important matter of health and death-rate already far more favoured than his brother of the towns. Take Liverpool, one of the most important and thriving towns of Europe; the mortality there, something like 40 per thousand, had become so alarming that last year the Town Council employed two high authorities (Drs Parkes and Sanderson) to investigate and report upon this matter. The *British Medical Journal* thus speaks of the results:—"It is impossible to read without an almost hopeless sinking of the heart that calm, clear, pitiful, and sombre report in which the irresistible mass of evidence leads to the conclusion that at the bottom of the fearful excess of mortality in that wealthy and intelligent city, lies the one wide-spread curse of intemperance. The people herd together like brutes, they couch at night in flocks in miserable, crowded and fœtid rooms. They have neither food, furniture, nor clothing; their children are killed off in hecatombs by exposure, slow starvation, and neglect, because husbands and wives, fathers and mothers regularly earning from 20s. to 27s. a-week, and often more, waste their substance in drink, brutify themselves with alcohol, and sink habitually by tens of thousands into the most fatal disregard of the habits of life necessary to health, mortality, and public safety." Verily, they that live in glass houses must not throw stones.

WANT OF OBSERVATION IN THE FARMER.

Perhaps the best way of testing whether the farmer acts justly by his workman is to seek an answer to the question whether the latter does or does not generally receive a full equivalent for the value of the labour he is able to supply. Of course this point is not so easy and simple to solve as in the case of many manufacturing matters, but reasonable conclusions might be drawn by any one thoughtfully estimating the value of crops and the proportion of cost which labour represented in their production. Probably little difficulty would be found in shewing that the labourer's pay, taking all the year, came fully up to, or exceeded, a fair valuation of the work he did. This being so, no rise of wages could take place under existing circumstances without a dead loss to the employer. How, then, could effort be made to improve the status and raise the income of the labouring man? The answer seems plain and inevitable—increase the value of his work. But how, again, can this be done? By making him a better workman in the matter of individual tasks. Seize systematically every method for making men dexterous at sowing a field, ploughing a furrow, mending a harness, sharpening a hop-pole, foddering a bullock, and managing a yard of dung. This was not a matter of vague generality, but of hard fact. He (Dr Monckton) had seen with his own eyes, within twelve months, important tasks so badly done that double the wages might have been paid for good work with profit to the farmer. He had seen wurtzel seed so unevenly drilled in point of depth, that five times the man's daily pay was thrown away, because he had never been taught that mere holding straight was not drilling, but that regular and shallow deposit of the seed was even more essential. He knew a hop-garden of favourable clays, and not of running sand, that had been drained three times in nine years, because of the imperfect fall secured on the earlier occasions. He had seen last season gangs engaged in hop syringing; the work accomplished by one gang would be more cheaply paid for at £1 a-day than that by the others at a crown. Again, why should not every farm of reasonable extent see that some of its hands could thatch, or stack, or build a pig-sty, or paint a waggon, or shear a sheep, or mend a fence? It had been too much the custom for a whole parish to depend on one thatcher and sheep shearer, who often earned 30s. in three days, and was drunk for the rest of the week. Surely our own workpeople might be enabled to benefit by these rather better paying jobs. A great industry had sprung up in the country in the use of creosote. How many of those now listening had ever so studied the matter as to know the very best time, temperature, and method for the process? He had himself seen professors of the art, men who let out tanks, and took contracts for their neighbours, and who did not even know what a thermometer was, and yet pole-dipping could never be done to the best advantage without its aid. Many workpeople in charge of those tanks now receiving 2s. 6d. a-day, would be better worth 4s. if rendered more observant, more painstaking, and better instructed.

THE DIRECTION OF LABOUR

But this leads us to the second method of augmenting the value of the workman's toil, viz., a more skilled and studied direction of his tasks. Of course it was clear in connection with what had already been said that the master must instruct himself, and exercise increasingly his own wits as well as those of his workman, and this feature must never be blinked. Not only morally, but in business aptitude, the man will be what the master makes him. Take a clutch of pointer puppies and give four away to four different people; the value of their labour in two years will depend almost entirely upon the pains and skill with which their respective masters have set and kept them to their work. An army of soldiers may be of exemplary skill and courage, and yet see their efforts nullified by unwise or insufficient planning and direcion. In the matter of labour a farmer must e exercising a perpetual foresight to make is operations dovetail and harmonize. The ob of to-day must be habitually so done as to render more cheap and effective the work of to-morrow.

Labour so directed will unquestionably yield value and shew a result. Without such management, men, though industrious and well enough master of each particular task, will inevitably muddle away time, and waste money *laboriose nihil agendo.*

MACHINERY EDUCATION.

Another mode of increasing the productiveness of so many hours' toil is to call in the aid of machinery. This applies to matters small and great, from the turnip cutter to the steam plough. The man who sows corn broadcast, leaves a full task of hoeing and cleaning to be done another day; he who follows the drill may be said to perform half the operation of hoeing at the same time. A big lad in charge of a tedding machine will outstrip a regiment with forks and rakes. We need only dwell upon this to remark much has been done, but much remains to do. Men will be more pleasant helpmates to the farmer, and more profitable aids, if their intelligence has been evolved by some early education. Their labour will be worth more, and they will win, without loss to their master, a higher wage.

Education was inevitable — it was not only coming, but had come. It was wisest to accept the inevitable, and to profit by it. This would not be an irksome task to those who thought with him that technical instruction to the man ought to be prefaced by some mental training to the boy—that reading, writing, and arithmetic were to do the business teaching of later life what draining and the subsoil plough were found to be in preparing for the future plantation of hops, not part of the hop-growing itself, but a most profitable and necessary introduction. It would be far better for the farmer to interest himself in and guide the education of his poorer neighbours, than to suspect, and keep aloof from the movement.

SUPPLYING THE LABOURERS WITH NECESSARIES.

Apart from the foregoing principles of relationship, though not apart from the very important principle of mutual sympathy and good feeling, are little details that come to the mind in connexion with this subject. Are there not many commodities which the farmer might help his men to purchase, and thereby give him a lift? Coals, for example, could they not be bought for labourers at wholesale price, and the carriage be given in? Perhaps sugar, bacon, and calico the same. Australian meat, like education, is becoming a fact. It might easily be looked upon as a competitor and an enemy; better give it a welcome, and turn it into a friend. Might not this be procured by a large farmer in considerable quantities, and sold to such of his men as choose to have it at cost price? Its arrival in this country will be an unmixed blessing if it be added to the amount of meat consumed, *i.e.*, if the artizans eat that at an easy price, while the wealthier classes consume as much as ever of home-grown meat at the present price. This end ought to be promoted, and its competition in the market disarmed, if the farmers with one consent bought it up, and supplied their labourers. After describing a stove that he thought might be very usefully introduced into cottages, Dr Monckton besought his hearers on several grounds to discourage beershops, and, at least, to refrain from weekly consenting to sign requisitions for fresh licenses in cases where they knew that an excessive number alteady existed. He concluded by submitting for discussion by the meeting the four following propositions:—1. That the labourer holds a fair position in the agricultural community, and one that is progressing in comfort and respectability as rapidly as other sections of that community. 2. That, as a general rule, the labourer receives a just equivalent for the value of the work he is able to supply; that, therefore, as a commercial necessity, his labour must rise in value before his wages rise in amount. 3. That no political change or combination would be calculated to improve his condition: such improvement must begin in himself, and will then be reflected upon his circumstances. 4. That education need not be feared as tending to disqualify the workman for his duties so long as the teaching of the school is broad and simple, and followed by the best technical instruction in later life.

CATTLE DISEASE IN AUSTRALIA.

PRESERVED MEAT.

THE Australian correspondent of the *Times*, writing from Melbourne under date February 2, says:—

The "foot-and-mouth disease," a subject of much more importance to Australia than any merely political question, has recently been discussed here in a public meeting of stock-owners and cattle agents. The late frequent references of the English press to this subject have very naturally set all persons connected with the pastoral interest speculating on the chances of the importation of the disease to this country, and the probably disastrous consequences of such a calamity. How effectually to secure the exclusion of the disease, with a minimum of injury or inconvenience to the importers of English stock for the improvement of our own breeds, was the main point to which one and all of the speakers directed their attention. Several experienced breeders urged the total exclusion of all foreign stock so long as the disease was reported to exist at home, but the majority of the meeting were of opinion, having regard to the length of the voyage between Europe and Australia, that a properly regulated system of quarantine would meet all the dangers we could reasonably apprehend. Resolutions, therefore, to this effect were passed, to be communicated to the Government in order that the necessary precautions should be taken under the provisions of our own statute. As the disease is said, by those who profess to be acquainted with it, to run its course in about ten days, and as cattle brought hither from England, if not affected at the commencement of the voyage could only take the disease afterwards by feeding on provender with which diseased cattle may have been in contact, a month's quarantine in all suspected cases was deemed to be security sufficient for the owners of stock in this country.

That our breeders have not been acting under mere panic will be apparent enough when we look a little closer at the subject and its surroundings. Grave and serious a calamity as "the foot-and-mouth disease" in England is, it would be a much greater, because a much less manageable evil here. In England, your flocks and herds are comparatively small, and within the control and treatment of homesteads and veterinary skill. Isolation, therefore, or, if necessary, destruction of diseased stock in England is easy; in Australia impossible. Our flocks of sheep are frequently in thousands, confined only in immense fenced paddocks guarded only by a boundary rider; and our herds of cattle roam at large in mobs over the many miles of a squatter's run. Hence, some of the more frightened speakers at the late meeting prognosticated that if the disease were once to obtain a footing in this country it would destroy the pastoral interest altogether, and banish beef and mutton from our tables. These extreme fears, however, are scarcely justified by experience, for cattle epidemics are not things of yesterday. Neither before nor since Virgil's time have farmers been for many years together exempt from one form or another of cattle plague, and yet, although disease and death in such visitations lurk in grass and water alike, beef and mutton are still sold by the butchers of Melbourne at lb., and will, I trust, continue at this , “ foot-and-mouth ” impediments not- tanding.

strengthen the interest we all take in reat food question, the same mail which ght us so much information about the disease also gave us the agreeable in- ence that the home demand for Austra- preserved meat has recently much in- ed and is extending to classes of society hitherto have been somewhat preju- l against this kind of food. Probably letter of Mr Edward Wilson, lately pub- l in the columns of the *Times*, in which o clearly and conclusively shews how cheaper, while not inferior in quality, ie Australian compared with the English s, may have largely assisted in recom- ling our new export to the English con- r. I long since pointed out to your rs that the fact of all bone being extrac- from our meats, necessarily of itself— from the first difference in price— ly reduces their relative cost to the con- r. Mr Wilson has, however, done good e by going a step farther. He has very ssfully shewn by his carefully recorded iment that the Australian meat already ed to its *minimum* weight by the process okery must, to be estimated aright, be ed against English meat under the same itions, in which case the difference in in favour of the Australian article nes much more striking.

to the popular prejudice—of which we read—against tinned meats, it were per- as idle to attempt to account for it as empt to account for a Scotsman's anti- to eels. It is certainly amusing to hear English working classes entertaining a e to preserved beef and mutton, while realthier classes both in England and alia have for generations been paying itant prices (as for luxuries only coming the means of the rich) for tinned game, l haddocks, tinned salmon, or any other rite article of food which can be preserved for exportation. It will, therefore, not “ surprise you to learn ” that on th of the world no such prejudice is ente by any class. So far from it, complain appeared in the correspondence colu the *Argus* that the Melbourne Con meats are only purchaseable in our reta at '9d. a lb., while it is apparent fr Wilson's letter that the same article i after the cost of freight and charges, sc lower price in London. Should any readers wonder why Australian con ever desire to buy preserved beef or n where fresh meat is generally so cheap, be sufficient to explain that on many d an Australian summer animals must be only a very few hours before they are eat in the only occasional alternative lef between unmasticable toughness on tl hand, or beef and mutton too “ high ” other, an alternative which, of course, sented to us at dinner-time without no tin of good, well-cooked, and well-pr meat is a most welcome thing for a appetite to fall back upon.

The New South Wales correspond our contemporary mentions also th disease has appeared in that part country. He concludes his remarks t

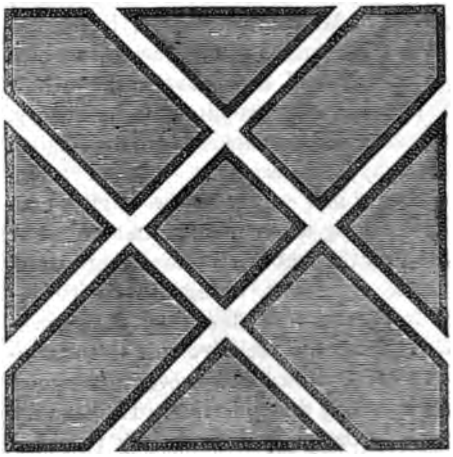
We have been visited by foot-and- disease—so, at least, we are informed veterinary sages, who in their own o are sager than yours. There is a doubt ever, on two points—whether they k foot-and-mouth subject when they se and whether the symptoms they d are those of the disease in question. animals are shut up in strict quar and therefore visible to none save th in charge and the officials. They ca the Parramatta and Madras. After wh curred in the Winifred, our noses have sharpened. The animals by the Parr shewed no traces of the disease unt were lodged in the quarantine ground. food, therefore, is blamed for conveyi virus from England.

The Garden.

LAYING-OUT FLOWER BEDS.

WINTER or early spring is the proper season for planning garden improvements, and it is well to put one's ideas upon paper in order that they may be properly considered and discussed. For masses of flowers, beds cut in the lawn are most effective; but if one wishes to grow a large collection of flowers there must be borders or beds of some kind. If circumstances restrict to a simple straight border, very well—accept the situation and let the beauty and variety of its contents so engross the attention of the spectator that he will not consider the kind of bed in which they are grown. It is a puzzling problem to lay out a flower garden for a miscellaneous collection. The elaborate patterns given in the journals and works upon horticulture are only effective when carried out in masses of colour. A flower garden for a lover of flowers —one who regards his plants as individuals, and not as parts of a mass of red, yellow, or blue—should be so planned that the beds can be accessible from all sides, and not inconveniently wide.

We give an illustration of a garden plan designed by a lady, in which the forms are all angular, and we hope at another time to present other designs. In all designs of this kind there are two troublesome elements, the paths and the edgings. It is about as much trouble to keep the walks in order as it is the beds; and unless they are well kept, the whole design will have a slip-shod look. Where good gravel can be obtained—gravel that will pack—the walks can be kept in order with comparatively little labour but this is not generally to be had, and perhaps the next best thing is some of the different asphaltes



Plan for laying out Flower Beds.

Grass edgings look well, but they require great care to keep them in order. Box can be made generally available, and where it will stand the winter, it answers well if kept properly clipped, and is re-set when it becomes too old. Bricks set on end are often used, but we hold them an abomination. Having a lot of spare bricks, we last spring used them to edge some beds, and have been quite dissatisfied with them ever since. Some tiles are made expressly for edging, but never having tried them, we cannot say how they will answer. Boards are sometimes used upon the margins of beds, but these are too perishable. The cheap, handsome, easily-put-down and easily-cared-for edging, live or otherwise, is among the things hoped for by garden workers.—*W.*

THE ART OF BOUQUET-MAKING.

BOUQUET, as sold by the fashionable florist or the humbler street er-vendor, is a work of art in more senses one. A first-class bouquet should not consist of choice flowers, but these ıld be so arranged with reference to ur and form as to produce a pleasing :t as a whole. A person of taste will the materials at hand to the best advan- , while another, with the finest flowers, make an unmeaning jumble. Those have never seen the florist at work ling up flowers into a beautiful structure, be surprised to know that wire and s form an essential part of his material. ı flower, leaf, and bud, whether large nall, is first provided with an artificial , which may be of fine wire, broom, or es, or a sliver of pine wood. We repro- from a previous volume two engravings (figs. 2 and 3), shewing the manner in which the artificial stems are used. Not only does the use of these artificial stems allow of a greater economy of flowers, but they are much more manageable than the natural ones, even if these could be had of sufficient length. Even the cheap bouquets sold along the streets have the flowers mostly provided with artificial stems. In the summer, some very common flowers are worked up into these bouquets so cleverly as not to be recognized at first sight. The common Hollyhock we are not accustomed to regard as a flower suitable for bouquet work, yet, when the outer circle of petals (fig. 1) is removed, and the central portion (fig. 2) provided with a stem, it makes a capital thing for a bouquet. The crimped centre petals have a peculiar crape-like texture, while the colours are exceedingly delicate, and when worked up with other

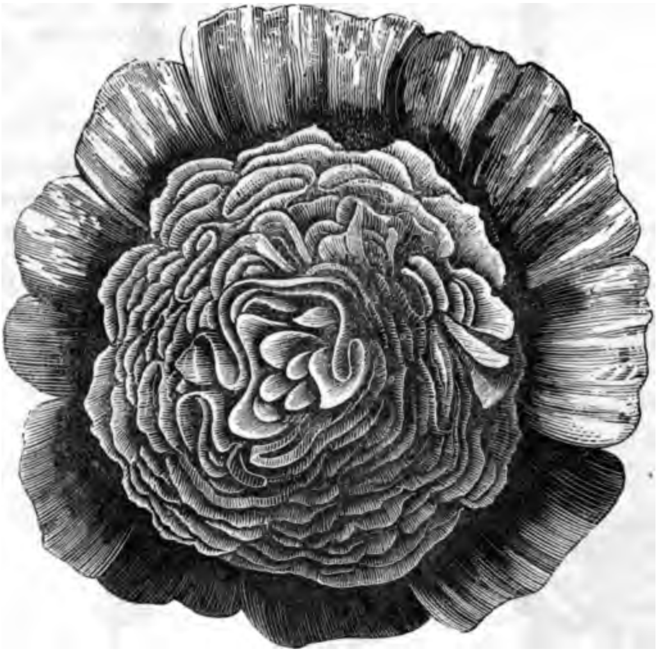


Fig. 1.—Hollyhock in its natural state, with large guard petal.

flowers look so unlike a Hollyhock, that when we first saw them in bouquets we could not make out what the flowers were.

The manner of treating an Abutilon will serve to illustrate how some flowers are "dressed" in order to make them better serve the purposes of the bouquet-maker. The flower of an Abutilon, in its natural state (fig. [illegible]) does not make much show in a bouquet; but when each petal is cleverly turned over, as in fig. 6, it looks like quite another flower. So, by a little management, the petals of a ragged-looking Rose, or a poorly-developed Camellia, are brought into a comely form.

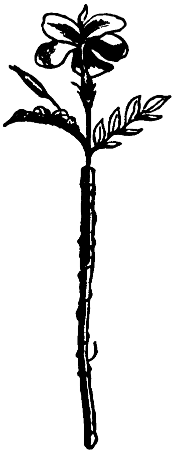


Fig. 2.

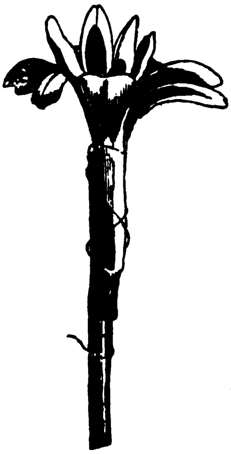


Fig. 3.

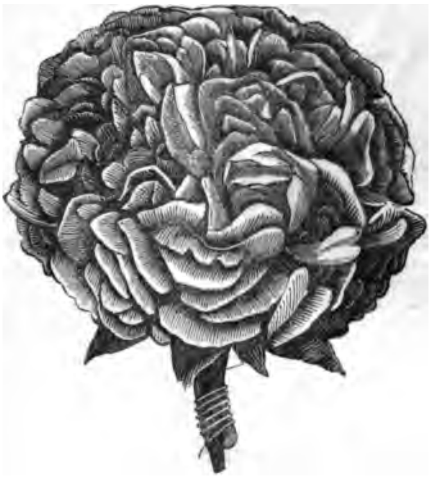


Fig. [illegible] dressed for a Bouquet.

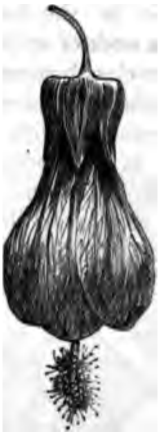


Fig. 5.—Abutilon flower in its natural state.

"It is too bad to treat flowers in such an unnatural way," said a fair-haired young damsel. "They should be allowed to remain as Nature made them."

"We quite agree with you, my dear young lady. Your hair is very beautiful, naturally; but, then"——

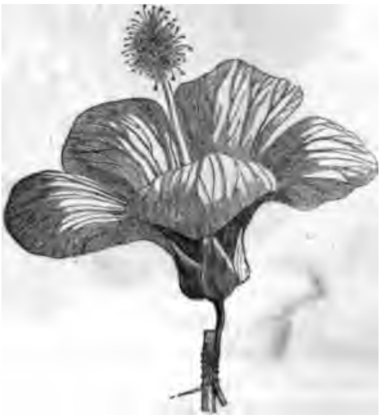


Fig. 6.—Abutilon dressed for a Bouquet.

"O you horrid man!"

NEW POTATOES.

SEEING that general attention is directed at this season to the planting of the tubers of Potatoes, it may be well to give our readers some idea of those which are comparatively new, but yet have been tried by parties properly qualified to express an opinion upon their merits. We shall first notice those offered by Messrs Sutton & Sons, who have placed blocks at our disposal for the better pourtrayal of their character.

Early Rose, fig. 1, is an American introduction. It was sent out, to the British grower, at quite fancy prices two years ago, with a character for prolificness and flavour not to be approached by any English seedling. That it is a wonderful cropper we have had an opportunity of seeing, although not quite justifying its high certificate. We have been much less satisfied with its flavour than with its want of coming up to the high class mark of productiveness. In the earlier part of the season, or, in other words, from July to September, it eats watery, and is more soft and Fluke-like in its quality than any even second-rate Potato ought to be. In truth, we had well-nigh discarded it altogether, but with the view of giving it a fair field, we reserved several tubers until after New Year's Day and found, to our astonishment, that the keeping in the house had effected a vast improvement in the flavour; that, instead of being watery, and the flesh pasty-like, it cooked to a fine white mealy consistency, and the flavour was equal to many of the best Rounds. For late eating purposes, the Early Rose is good; for early general gardening purposes, unless grown in poor soil—dry rather than otherwise—it will never take rank as a first quality Early Kidney.

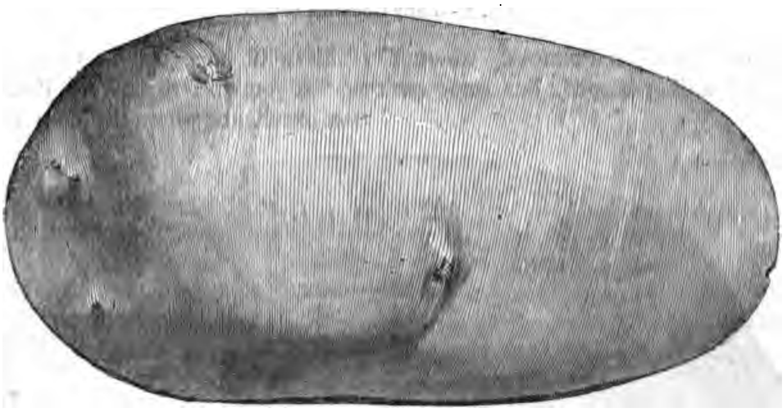


Fig. 1.—Early Rose Potato.

Early Goodrich, fig. 2, is reckoned to be one of the best of the American productions. We cannot speak with the same authority upon this variety. What we have seen of it is certainly in its favour. We like the roundish form and the somewhat ruffled skin of this variety better than the Early Rose. It was of fine quality when cooked in August, and was fully as productive as the other American rivals. How it would eat later in the season we had no opportunity of testing, but we have confidence in those who furnish us with a certificate of first excellence in its favour. The Messrs Sutton say of it, "One of the best new sorts from America, and in our trial grounds we have proved it to be one of the heaviest croppers of them all. It is a second early kind of fine flavour, and a great acquisition. It differs in foliage from other Potatoes. Most of the tubers are kidney-shaped, but some are round."

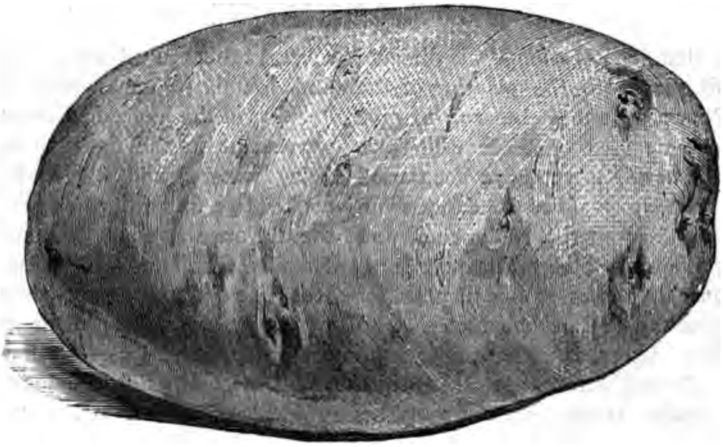


Fig. 2.—Early Goodrich Potato.

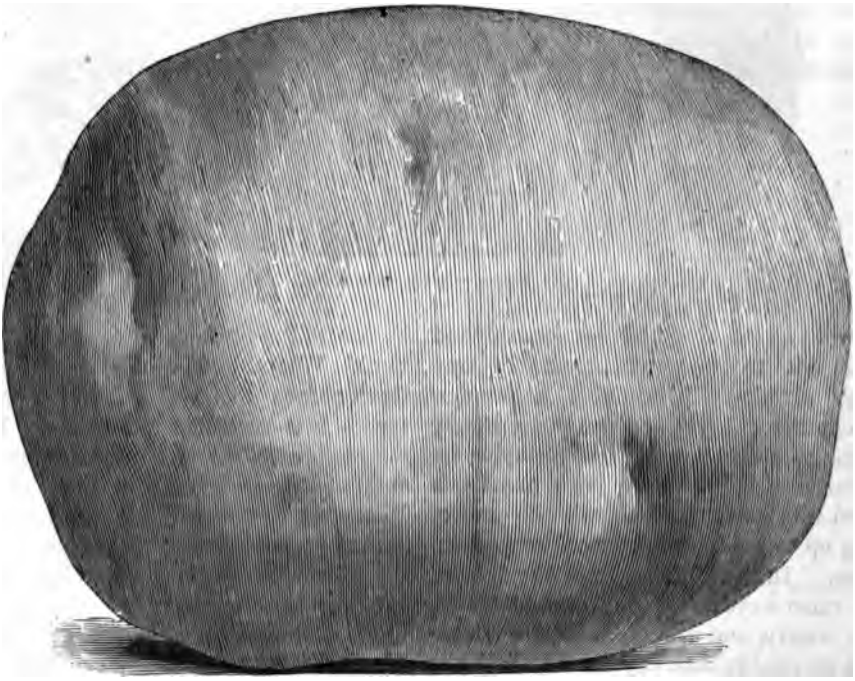


Fig. 3.—Red-Skinned Flourball Potato.

Red-skinned Flourball.—From a variety of sources, we learn that the Red-skinned Flourball, fig. 3 is one of the best general croppers in the market. Moreover, it is free from disease, and in that respect is a gain of no small importance. One grower writes us, "If you wish to have a Potato of first-rate excellence where the crop is good, the flavour good, and keeping qualities an object, get the Red-skinned Flourball." Some s say of it that it is quite first-rate in re- of appearance, and will be valuable on account for competitive purposes, but demur to its quality. Possibly it may out better late in the season. Soils very much to do with the quality of oes, and growers should therefore look to quality than to mere productiveness, d Potatoes mar the effect of an other- well served-up dinner.

an additional recommendation, we nt that of the Messrs Sutton:—"This did Potato, which resisted the disease season, and, without exception, the est cropping and best cooking late Potato in cultivation, was sent out by us in 1870, and at once became immensely popular. Last year there was such an extraordinary demand for it, that although we had an enormous supply, we were sold out long before the season was over. It is pre-eminently the Potato for storing, and is good for cooking long after the young Potatoes are ready, and we would not advise its use till after Christmas. When sent up to table, the Potatoes appear like balls of flour, and, when sufficiently known, we are confident it must supersede all other sorts for supplying the London market."

PATERSON'S SUPERB MELON.

E have all seen wonderful sized Gourds and Pumpkins—indeed it l take a monster to create a sensation g us; but whoever was prepared to hear nonster Melon, of the dimensions which hall presently give? Melons in good r are delicious when we seek shelter the burning rays of Sol, and growers fallen upon a plan of growing them in usual range of hot-houses or pits, and g them out generally better flavoured under the influence of fermenting re. But to have a Melon grown to Pumpkin-size, and to be told that it is exquisite flavour," grown under what in- e is not stated, but measuring the ordinary circumference of 42 inches weighing 24 lb., is an event sufficient nly to command attention, but to create sation. Judging from the engraving, son's Superb Melon (fig. 1), seems ke a good deal after the Scarlet Flesh Melon, engraved and coloured in the v Practical Gardener." We are not ubilant upon large Melons, as when once p, the gourmand even, does not quite to them, or call for a broken fruit a dinner meal, as he would for a Stilton cheese, to give a tone of palatable piquancy to the stalk of Celery that he finds delight in munching. Size, however, comes in for admiration and even for reward at all great Horticultural Shows; and consequently the subject of our notice sent us for illustration by the holders of the stock, the Messrs Wheeler & Son, will be appreciated, independent altogether of its usefulness as a dessert fruit, It is rarely we have great size combined with anything like high-class flavour. We accord-

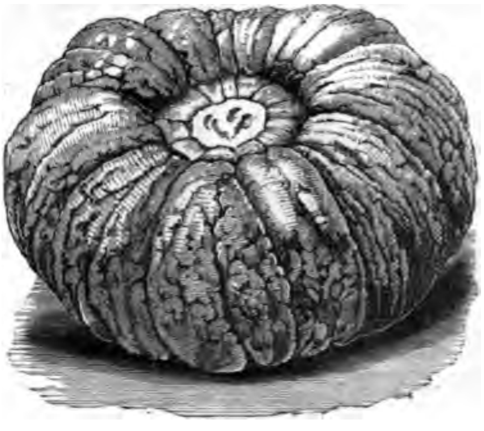


Fig. 1.—Paterson's Superb Melon.

ingly welcome the Paterson Superb Melon as one of the items that will command inspection by not only novelty hunters, but all who take pleasure in seeing out-of-the way articles, whether meritorious or not.

The following is the sellers' description, quoted from their catalogue :—

"This extraordinary Melon was raised during the summer of 1869, at Pontypool Park, by Mr Paterson, gardener to Mrs Hanbury Leigh; it weighed 24 lb., and measured 42 inches in circumference. It was raised from the Netted Scarlet-flesh, crossed with the Black Rock; the plant produced six fruit, so completely, that the other five did not grow until this one was cut, after which they commenced growing, but the season was too far advanced for them to ripen.

"This was of exquisite flavour, and very handsome, with fine rich scarlet flesh; and as seen by the dimensions given, of extraordinary size and weight. This is without doubt the finest Melon grown; it produced splendid fruit with us last year, and although not quite so large as the parent, it was of fine size, very handsome, and of delicious flavour.

COCO-NUT CABBAGE.

WE have had an opportunity of seeing this Cabbage, and find it to be a most valuable one, fully has hardy as the Little Pixie, and cabbaging quite as soon in the spring months. The great merit of a Cabbage is its earliness. Of course it must not be coarse, but both tender and crisp, and dish of a fine yellowish green. No one thinks of eating any of the sorts of Cabbage when Cauliflower and Peas come into use, therefore late season Cabbages are not so useful for general family purposes. When, however, one can get a good Cabbage hard on the heels of the Brussels Sprouts we can appreciate it, and put ourselves to some trouble in finding out its name and growing it ourselves, and inducing others to grow it. A fortnight in the beginning of the season is a great matter to those who cater for the culinary art, and hence why early maturing sorts of vegetables are so much prized. Nonpareil is a splendid sort, but it is larger and requires longer time to get firm and be fit for table, than either Little Pixie or Wheeler's Coco-nut. We have every confidence in recommending the subject of our engraving (fig. 1), furnished by Messrs Wheeler & Son, for these distinguishing qualities. It is of hardy constitution, standing winter weather fully as well as any we have seen grow alongside of it. It does not grow to a large size, and cabbages quite as soon as the best dwarfs we know of. It is crisp and palatable when cooked, and forms a fine companion dish to Snow's Brocoli. Many growers give it the highest recommendation. With it or Little Pixie and Nonpareil, no villa gardener need desire more, or be better served, supposing any of them grew dozens of sorts.

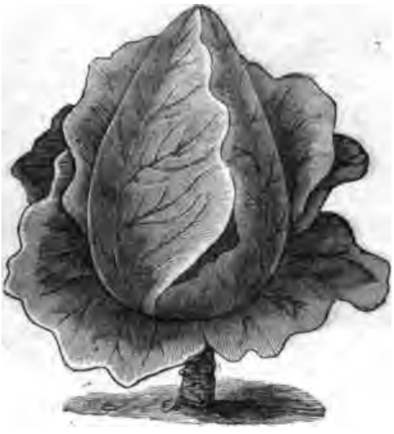


Fig. 1.—Coco-Nut Cabbage.

KINGSHOLM COS LETTUCE.

A GOOD summer Lettuce is more and more valued by all classes. The Moorpark long held a paramount place in the estimation of the grower, because of its qualities as a salad, and its non-disposition to run to seed. Bunney's Incomparable was the next favourite among Cos Lettuces, and an excellent sort it is; and now we have Kingsholm Cos offered, bidding fair to eclipse these favourites. Not that we believe it will be one whit better in quality, either in the matter of crispness or colour than Moorpark; but because it can be grown to greater size, and comes in well as a competition variety. A great point too in its favour is its not running early to seed. It is somewhat difficult to get a Lettuce in hot sultry weather of any size, fit for table. Many of the sorts grown in gardens will "bolt," as is the favourite expression for plants prematurely running to seed. Raisers, therefore, after being assured of the quality of well favoured seedlings, look with anxiety to their habit during the hot days of summer, and if they promise to "heart" well, and get full sized, they usher them into the market with some degree of confidence. Messrs Wheeler, who hold the stock of the Kingsholm Cos, and to whom we are indebted for our engraving speak of it thus:—

Kingsholm Cos Lettuce.

"This magnificent Lettuce made its appearance three years ago, in a large piece of White Cos—especial care was taken of it. It withstood the summer heat for a long time after all other varieties, with the exception of Wheeler's Tom Thumb, had run to seed, headed in without tying, and formed one of the most perfect models of a white Cos Lettuce ever beheld. At length it ran to seed; owing to the late period of the season it had started, the produce was, however, small. The whole stock was carefully preserved for next season's seeding; unfortunately the crop was again very limited, but the Lettuces were magnificent, many of them weighing 7 lb. each.

"It was seen last summer by a gentleman connected with Covent Garden Market, who remarked it was the finest Lettuce he had ever seen, and far superior to anything brought to the London market."

Arboriculture.

CONIFEROUS PLANTS FROM BRITISH COLUMBIA.

AT the Meeting of the Botanical Society of Edinburgh, held on the 14th of March, Mr M'Nab, Royal Botanic Garden, read the following paper on the Discoveries made by Mr John Jeffrey and Mr Robert Brown, Collectors to the Botanical and Arboricultural Expeditions from Scotland to British Columbia, between the years 1850 and 1866, with remarks on the cultivation and propagation of certain species:—

The first arboricultural expedition for the further exploration of Vancouver's Island and British Columbia was formed during the year 1849, under the patronage of the Hon. Lord Murray; Sir William Gibson-Craig, Bart.; Sir David Dundas, Bart.; Professor Balfour; Messrs George Patton, David Smith, Charles Lawson, William T. Thomson, Humphrey Graham, Archibald Turnbull, Isaac Anderson Henry, Andrew Murray, also Mr Charles M'Intosh and Mr J. M'Nab.

After the arrangements for the proposed expedition had been fully completed, and subscribers enough obtained, I was asked if I could recommend any one fitted to carry out the objects of the association. This I had no difficulty in doing, in the person of Mr John Jeffrey, a native of Lahore, Fife. Jeffrey had been several years employed in the Edinburgh Botanic Garden. He was a very energetic and painstaking young man, and nothing seemed to be a hardship to him. By his volunteering, during 1849, to ascend a high tree, in order to remove the extremity of a branch which had been broken with the wind, [illegible] which few ordinary men would [illegible] was first induced to take [illegible] He had also a great desire [illegible] obtain [illegible] knowledge of trees, shrubs, and herbaceous plants, by collecting, drying, and naming all that came within his reach, both British and exotic. I had no hesitation in recommending Jeffrey to the directors of the association, and for this mission he was at once chosen, and after having been furnished with the requisite instruments, and fully instructed in their use, he left Scotland in March 1850.

My object for bringing before the Botanical Society a notice of Jeffrey's collections, is in consequence of remarks given at various periods in the *Gardeners' Chronicle*, particularly during 1871, which convinced me that Jeffrey's discoveries were by no means fully known to the public. From my knowledge of his doings, I am enabled to state that he was the means of introducing nearly as many novelties in the coniferous line as the late David Douglas did while travelling in British Columbia between the years 1825 and 1833. Douglas's collections were all sent direct to the London Horticultural Society, examined and named by them from dried specimens and cones, and the seeds distributed amongst the members. Jeffrey's collections were sent to the British Columbia Botanical Association at Edinburgh, and distributed amongst the subscribers. When the packets sent home were large, all received their proportion according to the number of their shares; but when the contents were small, they were distributed amongst the shareholders by rotation. By this means of distribution, some of the rarer species had a chance of falling into the hands of distant parties, but whether anything decidedly new had been raised by them was not reported to us. I think I may safely affirm that all are now known, as far as the conifers are concerned.

A want of knowledge in the proper means of rearing coniferous seeds by many of the

ribers was no doubt the cause of some
e species being so scarce. The result
quiries from unsuccessful parties proved
a good many species were greatly injured
want of proper attention being paid to

It turned out that many of the seeds
sown at once in the open air, too deep
egetate, others near the surface where
got washed about with the rain, others,
ugh carefully sown in pots, were placed
rong hot beds or cold frames, green-
es, vineries, &c., and frequently deluged
water or dried up by the sun. The
careful had them sown in boxes, or
flats, over properly prepared soil, and
d in partially exhausted hot bed frames,
attended to with shading when necessary.
e this was the case and the seed good,
parties were generally well rewarded.
frey had a good knowledge of most of
oniferous plants introduced by Douglas,
generally cultivated in this part of the
try, but some were scarce and only
n by name; besides, the appearance of
trees in their native condition is often
y different from the same species of
l size cultivated in gardens and pleasure
nds. This seeming resemblance was no
t the cause of several of Jeffrey's novel-
being introduced under wrong names.
me instances, the difference in the young
s after being raised was not distinguish-
for several years, particularly with some
es of the Picea tribe. Some of the
named plants of Jeffrey's seeds have
re-introduced by recent collectors, and
he has been robbed of the credit
h unquestionably belonged to him.
here Jeffrey gave no names to the cones
cted, the association gave them provi-
al ones, and in some instances described
figured them previous to their being
ibuted, while those which Jeffrey himself
ed from a seeming resemblance to those
ad previously seen at home, were sent
under the names he assigned to them.
ral of these did not afterwards turn out
correct. Besides, some of those named
e association turned out to be plants
formerly described, although not previously introduced.

As most of the circumstances connected with these expeditions are known to me, having had an interest in them from their commencement, I am anxious to give, as far as I can, a detailed notice of all the conifers discovered and introduced for the first time by the collectors to the association.

From the time Jeffrey went out until his death, he sent home dried specimens of no less than 1700 species, consisting of trees, shrubs, and herbaceous plants, all consecutively numbered, and referring for particulars to his diary, which unfortunately never came to hand. Authentic particulars of his death never reached this country, further than that he was killed while trading with the Indians. In 1854, a box containing some of his books, instruments, and a quantity of dried specimens were received by the association, having been sent home by the Hudson's Bay Company, but no diary was found, which was a great disappointment.

It will be needless to give a full list of the seeds of all the trees, shrubs, and herbaceous plants sent home in different consignments. I shall content myself more particularly with the coniferous trees, as they were without exception the most interesting part of his discoveries.

Before leaving this country, Jeffrey's attention was particularly directed to look after those kinds which were then exceedingly scarce in Britain, such as Picea amabilis, P. grandis, P. nobilis, as well as other genera and species previously introduced by David Douglas. The two former species have never been received correct from any other collector.

In 1851, Jeffrey sent home cones and seeds of a tree under the name of Picea grandis. The association, believing it to be correct, took no further notice of it at the time. Of recent years, seeds of this same Picea have been sent home by other collectors, named by one Picea Lowii, by another Picea Parsonsii, and under the former name it is now extensively cultivated. Very few plants of that long-leaved species can have been raised from Jeffrey's seeds, as original seedling plants are by no means plentiful. One raised here has been twice transplanted after being 6 feet in height, and is now a beautiful tree 15 feet high, and 36 feet in circumference of branches. In its native state, Jeffrey says that it grows to the height of 280 feet, with a stem 15 feet in circumference. Jeffrey has undoubtedly the credit of introducing this very handsome tree, notwithstanding the discussion which at various times has taken place about the naming of it. It therefore ought to have been called Picea Jeffreyii.

The cones sent home by Jeffrey under the name of Picea amabilis are not the P. amabilis of Douglas. After the young plants were of such a size as to satisfy me that it was not that species, I provisionally named it P. magnifica. This is a most beautiful tree, perhaps the handsomest of all the Picea tribe. One of the original plants in the garden is now 11 feet high, and is easily known by its robust habit, pyramidal shape, and sharp rounded leaves, as well as the delicate bluish-green colour of the new foliage during the summer months, and the perfectly green state during the winter season. The cones of this species were large, and had a peculiar curve in the middle. They were much destroyed by insects, which was the cause of so few being raised. Not many years ago a large quantity of the seeds of this variety were sent to Messrs Low & Co., nurserymen, Upper Clapton, London, also under the name of Picea amabilis. The seeds being good, were soon raised, and extensively sent over the country under that name. They are identical with the variety sent home by Jeffrey, and now called P. magnifica.

Jeffrey also introduced a Picea which was figured and named by the Oregon Association as Picea lasiocarpa. This is a very free growing tree, many of the annual upright growths being above 3 feet in length, on plants only 10 and 12 feet high. These upright shoots afterwards become stinted by the free growing nature of the side branches. The largest plant in the garden is now 20 feet high, the circumference of the branches on the surface of the ground being 48 feet. Many of the seedlings recently raised in this country from North-west America as Picea grandis, seem to be identical with the Picea lasiocarpa of Jeffrey, and totally different from the P. grandis originally sent home by Douglas.

Of the genus Abies, Jeffrey was instrumental in introducing three species previously unknown to the British gardens; the most prominent being the Abies Albertiana, a species somewhat allied to the hemlock spruce. This is one of the most graceful of the tribe, particularly if growing on soils suitable to it, such as a peaty loam. Some of the original plants sent home were planted by the late Lord Justice-Clerk Patton, in what he called the Moor Pinetum nursery at the Cairnies, in Perthshire. They are admirable specimens, and must be now upwards of 35 feet in height, proving that peaty soil is the most suitable for their growth. The largest specimen in the Edinburgh garden is only 25 feet in height, growing in soil of a sandy nature. Notwithstanding that the Abies Albertiana is allied to the A. canadensis or hemlock spruce, the latter does not succeed here, nor has it the constitution of the A. Albertiana when seen growing side by side in situations where the A. Albertiana succeeds well. Other allied species sent home by recent collectors, under the names A. Bridgii, A. Mertensiana, and A. Williamsonii, do not appear to be specifically distinct from the A. Albertiana of Jeffrey. Besides, the A. Albertiana, when growing in different soils and degrees of elevation, varies very much, which makes one think that it is identical with the three former named species; such, however, may not be the case when all are seen old enough to produce cones.

Abies Pattoniana is another species introduced by Jeffrey, and one previously unknown in Britain. The Abies Hookeriana was also sent home by him at the same time. These two species, although somewhat allied in habit, are totally distinct when examined together. The leaves of the former are green on the upper side and whitish beneath, while A. Hookeriana has a uniform glaucous colour all over. The leaves also have no proper upper surface, being rounded, and densely set on the branches. The finest specimens of the Abies Pattoniana known to me are to be seen at Glen Almond and the Cairnies, great care having been taken of them by the late proprietor, whose name it bears. At my suggestion (many years ago), the side branches were foreshortened, which has given the plants an upright tendency. Both species are exceedingly hardy, and, like the Abies Albertiana, luxuriate in soil naturally composed of loam and peat. As these plants have a great tendency to branch on the surface of the ground, instead of cutting them off, I would recommend them to be treated as layers. By doing so a great advantage will be gained by inducing in them an upright growth. The way I find the layering of these plants to succeed best is to bare all the lower branches of their leaves and small side shoots, leaving 8 or 10 inches at the point undone, then twist a very fine copper wire tightly round the lower portion cleared, and peg the branch down in a mixture of loam and peat, previously prepared and placed round the plant, covering the surface afterwards with a coating of sphagnum moss, and placing stones on the surface to prevent the moss from being blown about, besides assisting to retain the moisture round the layers. If the layering practice is carried on for a few years, the plants will soon begin to assume an upright habit. I have never succeeded in striking either of these species by cuttings.

Several other species of Abies were also received under the names of A. alba, A. nigra, and A. rubra. Whatever the two former species may turn out, the last, A. rubra, is a very distinct looking tree, with pendent branches and soft pale-coloured leaves. A good many seeds of this tree were distributed, but I have not been able to learn of any being planted in peaty soil, like the other species of Abies previously noticed. It is well known that most of the Abies tribe luxuriate in peaty soils, where the Norway spruce (Abies excelsa) is to be seen in its healthiest condition, as also the originally introduced specimens in Scotland of A. alba, A. nigra, and A. rubra.

A good deal has yet to be learned as to th soils and situations best adapted for growin the different genera and species of conifer Little or no information on this very important subject has been communicated to u through the medium of botanical collectors we can therefore only arrive at conclusion from an examination of the more recentl introduced species now growing in thi country. When seeing them in some soil and situations, we would scarcely believe tha they are the same species that we see in othe places. Piceas generally succeed best whe growing in deep heavy rich loam, or loa naturally mixed with peat, particularly man of the soft and blunt-leaved species, as Pice nobilis, P. amabilis, &c. While the generalit of the prickly-leaved species, such as Pice cephalonica, P. pinsapo, and the other allied species recently introduced, appear to be totally different plants when seen growing in a limestone district. At Craigo, in Forfarshire, P cephalonica and P. pinsapo fa eclipse all other specimens planted in other places at the same time, except in those localities where limestone exists, a strata which they are accustomed to grow on in their native country. I have no hesitation in saying that Picea numidica, P. bifida, and P. cilicica will grow much better on the limestone formation than they now do in the loamy soils so well adapted for many other species of Picea.

The finest tree of Abies Menziesii to be seen in Britain is the one on the Keillor Moor pinetum in Perthshire, planted by the late David Bishop, wood forester, Methven. This tree is growing in deep peat soil, and judging from its vigour, one would almost fancy it to be a distinct species from the plants of A. Menziesii generally seen growing under ordinary circumstances. The Picea pichta is another tree totally changed in appearance when growing in soil of a peaty nature, where it assumes a remarkably pyramidal habit, while in ordinary loamy soils it is more or less bushy. The subject of soils is so very important that every scrap of information we can obtain will be serviceable to parties wishing to plant on the soils they possess, such kinds of trees as have already been proved to grow freely on similar soils.

Picea nobilis, as I have said, is one of the trees which luxuriates in soil naturally composed of peat and loam. Although I have often tried the artificial mixing of peat and loam for this tree, also for several other species of conifers, they never assume the luxuriant appearance of those growing in the natural mixture. It may not be out of place to state, that many conifers, indeed I may say all, luxuriate in loam mixed with very old decayed horse manure. It throws a vigour into them almost equivalent to the natural peaty mixture. This is particularly noticeable with all the blunt leaved Piceas, particularly the Picea nobilis, P. amabilis, P. Lowii, P. magnifica, &c.

Many individuals are much averse to the use of manures for conifers, and many are the questions put to me regarding the use of such stimulants. In a rough or fresh condition it is by no means satisfactory, but totally different in a decomposed state, as is generally procured from old hot beds. While using manure it is necessary that it should be thoroughly mixed with loam before putting it round the roots of newly transplanted conifers; and for established ones, such as Araucarias, &c., the opening of a trench round the plants and filling it up with the mixture alluded to, will soon tell on the branches of the trees. I have never found guano or liquid manure equal to the old decomposed horse manure, as a stimulant for conifers.

Of the Cupressus tribe several interesting species were received from Jeffrey, and several mis-names have to be corrected. The Libocedrus decurrens, which may be ranked amongst his best introductions, was sent out by the association under the name of Thuja Craigana, in compliment to Sir Wm. G. Craig, Bart., of Riccarton (an arboricultural amateur of high standing), and I find it is still extensively cultivated under that name. This Libocedrus grows to the height of 40 feet, with a stem 9 feet in circumference. It must be grown in deep rich loam, in a somewhat sheltered situation, as it is very liable to be destroyed when fully exposed to the wind. It propagates freely by cuttings, and makes excellent plants, but it takes time to do so. Instead of forming roots at once, a rounded ball, about the size of a hazel-nut, is often produced at the extremity. If the cuttings are lifted, and portions of the outer skin of this small brown swelling cut off, roots will soon be given out from the edges of the cut extremities. Without this manipulation the cuttings will lie a long time in the ground in a fresh condition with no appearance of growing. The Libocedrus is likely to form a noble plant for the warmer districts of England and Ireland. One standing on the lawn in the Worcester nursery is 18 feet high, with a stem 2 feet 6 inches in circumference at base. The tallest specimen in the Edinburgh garden is 14 feet, and the habit is quite that of the Irish yew. Grafted plants were sent from the Continent some years ago, and named L. decurrens divaricata. When first received, the branches had a peculiar diverging aspect, probably owing to their free growing nature, on account of being grafted. Such plants are now quite as upright as any of the original seedlings.

A Thuja, raised from seed and which has turned out to be the true Thuja gigantea, is another acquisition, first sent home by Jeffrey. When raised, the seedlings had much the appearance of Thuja occidentalis, and little attention for a time was paid to it. After a few years it began to assume an upright habit, and has gone on rapidly increasing. The largest specimen is 20 feet high, and 18 feet in circumference at the branches. Numerous plants introduced by other collectors, under the name of Thuja Lobbii, T. Menziesii, and Craigana, appear only to be varieties of T. gigantea, and although not as yet taking the rapid upright habit of this tree, they are very closely allied to it. This tall species of Thuja is perfectly hardy, and readily increased by cuttings. From its peculiar upright habit, and standing the wind well, it will form a great acquisition to pleasure grounds; and as the timber of it is said to be good in quality, it may some day or other be grown for forest purposes. Although the habit of the plant is that of an upright growing shrub, it will lose its lowe

ies like the ordinary evergreen coni-
'hen growing close together.

ther Thuja was raised from Jeffrey's
by Messrs Backhouse & Son, of
This plant has a very distinct habit
wth, resembling in some respects the
. gigantea. It puts up a strong loose
hing leader, having all the side branches
or less pendent, the points of all
g upwards, and each of the lower ones
ing the appearance of a leader. This
r was sent out by Messrs Backhouse
the name of Thuja Craigana, as it hap-
to come up in the pot in which the
edrus decurrens seed (then called T.
ina) was sown. This peculiar variety
r extensively cultivated under the name
Craigana. It is readily propagated by
gs, and is easily distinguished in habit
ll other species of Thuja. The largest
growing here is 15 feet high.

nost interesting tree of this section I
not omit to record, that is, the Cupres-
iwsoniana. Although Jeffrey had not
:edit of introducing the seed of this
eautiful tree, he certainly deserves the
of discovering it. I stated at the
encement of this paper that after the
of Jeffrey, all his effects that could be
ed were sent home to the association,
ing a large number of dried plants,
;st which were found several sheets of
lly dried specimens of what is now
Cupressus Lawsoniana, in excellent
vation. Judging from the quantity
e trouble taken to dry them, it must
een looked upon by Jeffrey as a plant
r of being introduced. No seeds
er were found. The specimens must
been collected fully a twelvemonth
us to the large quantity of seeds which
ent to this country during the autumn
5, and then named Cupressus Lawsoni-

he genus Pinus, Jeffrey was successful
:oducing some new and interesting
;. Perhaps the finest of all is the
Jeffreyii, which was named and figured
Oregon Association in compliment to
:overer. The P. Jeffreyii is stated to
grow to the height of 150 feet, with stems 12 feet in circumference. In this country its habit of growth approaches that of P. Laricio, and, like it, the whorls of branches are proportionate to the age of the tree. This tree has a peculiar whitish green colour, and is now very extensively introduced into many nursery establishments, and ought to be planted in forest groups by some of our enthusiastic arboricultural proprietors. The largest specimen in the Botanic Garden is now 19 feet high. It was introduced in 1853, and has seventeen whorls or branches.

P. Balfouriana is another new and remarkable growing pine. In its native condition, it grows to the height of 80 feet with a stem 9 feet in circumference. In this part of the country it seems inclined to be dwarf. It retains a leader, and regular side branches. The leaves are arranged round the branches exactly like little bushes. Although introduced during 1852, the tree in the garden here, notwithstanding its symmetrical shape, is scarcely 3 feet in height. In peaty soil, and in a more southern climate, I have no hesitation in saying that the result would be different. Very few seedlings must have been raised, as few of the original plants are to be met with. Grafted ones only are to be had in nursery establishments.

Pinus flexilis is another of Jeffrey's introductions. It is a diminutive tree, growing in its native habitat to the height of 40 feet, with stems 3 feet in circumference. Being a mountain pine, it is inclined in this country to assume more the appearance of a large shrub than a tree. Like the P. Balfouriana, it is very rare in collections, and, like it, few seeds must have been raised. Grafted plants under this name are to be had in nursery establishments, some of them however totally different from the original P. flexilis sent home by Jeffrey.

Pinus Murrayana is another of Jeffrey's introductions. Of this tree the seeds must have been mixed, as two distinct varieties came up. The one having an upright growth and of a beautiful light green colour. The other of a scrubby habit and dark green, very different from what Jeffrey described it, viz., a conical growing tree. One of the finest specimens of the upright variety that I have seen, is growing at Borthwick Hall, near Edinburgh, the seat of Charles Lawson, Esq.

Jeffrey also sent home seeds which he called Pinus tuberculata. This is a very interesting tree, having a large globular head of a light green colour, and very hardy. In this respect it is very different from the plants previously cultivated under that name, and originally sent out by a London nurseryman. These plants had more of a tree growth, with thicker leaves of a dark green colour. The latter were entirely destroyed here during the winter of 1860-61, while Jeffrey's stood uninjured on the same piece of ground. Besides the foregoing species of Pinus, Jeffrey also sent home seeds and cones of several kinds previously introduced, such as P. Lambertiana, P. monticola, P. Benthamiana, P. ponderosa, P. Sabiniana, and P. Coulterii.

Jeffrey's seeds were divided into 281 shares, and sent to subscribers all over Europe, and even to America. Other species of conifers than those here noticed may have been raised, the owners probably imagining that they must have been grown by others parties as well as themselves.

The Veterinarian.

VETERINARY SUPERVISION OF STOCK.

HE increasing value of British stock,
together with scarcity, which is every
ecoming more evident, renders it evi-
necessary that *something* must be in-
d in order to avert the consequences
re strongly foreshadowed. Doubtless
hole machinery that must be raised, and
nto harmonious working to effect the
d end, must be of determined character
f gigantic proportions—it must be as
ful at "Land's End" as at "John
at's," and as protective to the honest
as it is severe upon the roguish dealer.
ave space to notice only one of the de-
ents of this machinery at the present—
f strict veterinary supervision in the
ntion of diseases, and as an aid to stock
gement.

re are few persons who are prepared
nit that the practice of veterinary medi-
s capable of affording much real and
le assistance to the community. It is
led at this period too much as an in-
dent calling, one merely available only
emergencies arise and conditions of
l life have baffled all domestic skill and
intelligence; and as all hopes of suc-
t such a period are always the most
r, being usually denied, the profession
nerously and sometimes almost ignomi-
y slighted, and even slandered for its
bility of achieving nothing short of
es, and supernatural manifestations
lly.

system at present pursued is not only
ental to the professional body, but it is
y unprofitable to the agricultural and
ercial communities, and effectually pre-
the exercise of those fundamental
les, which, as an integral part of our
economy, veterinary medicine is capable of developing and adopting for the good of all. It is freely admitted on all hands that our cattle, sheep, and pigs represent our principal wealth, and greater profits arise from their being raised than from any other department of agriculture; yet while our merchant princes attract the greatest skill to the side of their well-kept horses in large towns, the rural districts, where the greatest necessity exists and opportunities for observation and experience are the most frequent and valuable, are almost wholly unprovided for; while the large towns principally of Great Britain avail themselves of the services of about 1000 skilled and properly trained men, the rural districts are content with the most illiterate, who swarm as ten to one, absolutely living as parasites upon the losses of agriculturists, and making proceeds only out of the sale of worthless physic. When contracts are made, the principal object is to secure attendance and physic at a low rate, while more legitimate and useful ends are lost sight of, and thus no improvement on the original plan takes place.

The nature of the diseases, together with the management of our horned and other stock, require more than empirical treatment. It is a gross mistake to suppose that any pretender will answer to treat their maladies, and, still more, to believe that any but a well trained man of scientific attainments, will answer to undertake a careful supervision in order to prevent the origin and spread of diseases. This latter is, we believe, the only proper course in which veterinary science should be employed, and the great wealth of our stock, with the jeopardy hanging over it, are powerful reasons why it should be chosen to the task. The principles of feeding; details of management generally; study of indigenous diseases; character of soil and vegetation, locality, climate, and a host of similar matters, require close attention, and being beyond the province of the farmer himself as an abstract thing, appropriately come under the notice of a person who should be always occupied with them. Good men will not settle in country districts if they can avoid it, and aim at getting into large towns, because in the first all is hard work, little gain, and most irregular payments. Yet farmers expend more money annually upon false practice and worthless medicine than would amply remunerate a scientific and thoroughly qualified veterinarian, if he were retained for the purpose of exercising a strict supervision, rather than for the sole purpose of cramming physic down dying animals' throats.

The proper purpose appears to be this: A number of agriculturists should secure the services of a qualified and experienced man for their district, guaranteeing him a suitable sum per annum, his time being partially or wholly devoted to the combining members, as they may agree, with liberty, in case of partial occupation, to take additional practice. The first, however, is not so likely to answer so well as when his whole time is at the service of the members. The veterinarian thus becomes their resident adviser, and with whom important consultations may be made. He will have stated times for visiting each farm and examining all the stock. When illness arises he will have every opportunity of watching the progress of disease and arresting it in an early stage. When deaths occur proper investigations are made, and disorder, arising from whatever cause, receives close attention, everything being recorded minutely and reported to a managing committee, while the information furnished is rendered available in the prevention of such misfortunes as we daily witness. In the principles of feeding alone, and from errors about which so much loss arises, the constant attendance of a scientific man, thoroughly conversant with animal physiology and hygeine, would work an important reformation, and set at rest many questions which now prove perplexing.

In this matter agricultural clubs and associations might take prominent and profitable part, by assuming the principles of management. If twenty farmers desirous of improvement in the subject at issue, would combine for the purpose, a suitable man might be induced to give them his whole attention for as little, certainly not more, than the sum they now expend in farriers' bills and drugs at the chemist's shop. The principle works well in large establishments of horses, and more profitably so in proportion as the attention is devoted to strict principles of management and maintenance of sound health, and avoiding everything that militates against it. Stock management may stand alone and be partially successful, but it is not complete without scientific aid, nor will it be wholly successful unless it adopts the alliance we point out.

SALT AND ASHES FOR HORSES AND COWS.

SOME years since I was engaged in work that required the use of a great number of horses. I was always treating one or another for colic. My men said the horses had the "botts," but I greatly doubted this alleged cause of the trouble. However, I used all the usual "bott" remedies, such as treacle and milk, and physic afterwards; but the evil still continued. One of our men always had his team in a useful state of health, and we all thought it proceeded more from the non-liability of his horses to the disorder than from any specific he used. He had, however, his remedy, which he had been constantly using, and this consisted simply in salt and ashes; a handful every few days was all that

essary. When the treatment became
I caused a triangular division to be
n each horse's manger, and this was
pplied with rock or Liverpool salt
with ashes, about one-fourth ashes to
urths salt, and sometimes a little sul-
d rosin. I do not imagine any par-
specific existed in the Liverpool salt;
und it better on account of its being
arse in its crystals, and consequently
le to dissolve with the horse's saliva.
er, I have no doubt any salt is equally
effect, but the mechanical action of
rse salt is certainly best.

that time all colic ceased, and I had
e trouble with it. The horses were
very hard, and had very little time
especially at noon, and from some
felt convinced that there was too
cidity in the stomach, and that the
sequently passed in an offending state
bowels, and caused the disorder.

e this ailment only occasionally at-
rses, I have found the use of salt and
iven from a black bottle, and care-
ministered to avoid choking, very
us. In giving a drench, never pull
tongue, as the horse may choke; hold
head, and pour down about half a
ful at a time. One old team of mine
vays subject to it in summer time
a journey, rarely otherwise; and the disease always yielded to about half a pound of salt and as much water as would make it palatable to drench, so as to avoid choking. Sometimes I found the use of the enema, or clyster of thin water gruel, thrown up in quantities of a pailful at a time, very useful. The dung passed freely, and no bad effect could arise from its use. I frequently used it in obstinate cases. Horses unused to travelling long journeys are very subject to this disorder, though as long as they are kept on the farm at slow work, you would never observe any symptoms of it. The same remedy is excellent for hoven or blown cattle.

I had a most excellent cow that would "blow" at any time whenever she ate too much clover or grass, especially when taken into the stomach wet, as well as when young and succulent; and this remedy was always at hand and always successful.

I generally followed the treatment with a pint of melted lard, a remedy that never hurts horned stock, and is often most excellent in its effects. Cows must never be bled if it is possible to avoid it. In former years cows were often bled by ignorant amateur farmers, but it is hardly ever necessary in ordinary cases; and to bleed a milking cow is to destroy her dairy properties for some time at least. Strong stimulants generally answer much better, especially after calving and in milk fever.—*C. L.*

INOCULATION A PREVENTIVE AGAINST PLEURO-PNEUMONIA.

WITHSTANDING the opposition
iven by high professional authorities in
l to inoculation for the prevention of that
fatal disease of cattle, pleuro-pneumonia,
distemper, the operation is (says the
rmer's Gazette) every year gaining in
n Ireland amongst practical men con-
vith stock—even veterinary surgeons,
whom now declare, as a result of their
ce, that it is as effectual a preventive
pleuro-pneumonia amongst cattle as vaccination is a preventive of small-pox in human beings; and some seem inclined to believe that it is even more so, as the occurrence of pleuro-pneumonia in properly inoculated cattle is, comparatively speaking, much more rare than the occurrence of small-pox amongst vaccinated human beings. We have made most searching inquiries relative to the results of inoculation performed years ago on the stock of some farms in the south and west of Ireland, and find, we confess to our surprise, although

greatly to our satisfaction, that, with one exception, all the owners of the animals operated on report in the most favourable terms relative to it. Some assure us that, although lung distemper had been on their farms for years previously, causing several deaths annually, not a single case of the disease has occurred on their lands since they had their stock inoculated. Others, not so fortunate, have had an occasional case of pleuro-pneumonia on their farms since their stock had first been inoculated, but none of the so affected animals had ever been inoculated, nor had been bred on the farms, but had been purchased, principally at fairs or from cattle dealers, who, for the most part, according to Professor Ferguson, are in Ireland as noted carriers of cattle disease infection throughout the country, as pedlars and tinkers are of fever and small-pox during an epidemic of either of those maladies. But when such so purchased and introduced animals were inoculated to check the spread of the disease which had broken out amongst them, the operation has invariably, as far as we can ascertain, been quickly followed by the desired results. The single exception, to which we have alluded as the result of inoculation to prevent the occurrence of pleuro-pneumonia not being satisfactory, occurred in Tipperary, and was one in which a great number of animals died, evidently from the effects of the operation, the inflammatory action caused by which was of such a nature that it rapidly extended and caused extensive mortification, eventuating in death, the cases presenting all the symptoms of blood-poisoning. On further inquiry, the untoward results were accounted for by many animals in the locality previous to such inoculation having suddenly died from apoplectic congestion—a disease of which splenic apoplexy, grass staggers, and blackleg are modifications—and that the matter used for the inoculation had been taken from the lungs of an animal which had died suddenly, although evidently affected with chronic pulmonary disease, which had been mistaken for pleuro-pneumonia of the ordinary infectious type; also the operation had been performed in a most butchering manner by a person who too deeply and extensively cut down at the base of the tails, and had, in each case, laid a piece of the diseased lung in the incision and there retained it, and where it remained until mortification set in. The only objection to the operation seems to be that no matter how skilfully performed it occasionally causes the loss of the tail, when that is the part inoculated.

The Dairy and Poultry-Yard.

THE MANAGEMENT OF POULTRY.

AN EXAMPLE NOT TO BE FOLLOWED.

IS season of the year is one of great importance to all persons who keep , for upon the success attending the of the hen in producing her per- number or clutch of eggs depends the of her owner. When we come to upon her, it must be conceded that a really wondrous little creature, pro- in the egg an article containing so exquisite elements, so nutritious, so le as an article of food for man, so le in a commercial sense, and so useful several constituent parts both to art ience, and offering to the student such y means of witnessing the truly marvel- evelopment of life from its earliest and s embryonic conditions.

ery sad and miserable state of things came under our notice in connexion is subject whilst lately visiting a really farm, where all the stables, cowhouses, ies, and dog-kennels were all fitted up ept in good order, but where the poultry sad failure. As we are in the habit of we in this case asked permission to hose departments before inquiring after ultry; and, having satisfied ourselves extent of means at command and the itions likely to occur from a family of ersons, without servants, we lastly in- for the hen-house; when, lo! we ntroduced to an ill-devised, neglected r of the orchard abutting on to a small of stale, tainted-looking grass. The use was a long and tolerably lofty but ty room, which with proper manage- might have been made to roost at least wls, and provide ample laying and g places beside; but here we had great difficulty in maintaining our equilibrium, so great was the extent of the accumulations in every part. The nesting places were composed of a numerous series of close wooden compartments arranged against the walls, in about six only of which were to be found a few fragments of dirty hay; we placed our hand in one of them to remove what looked at first sight like a dirty egg, but which turned out to be a dirty lump of chalk; upon removing our hand we found it covered with numerous specimens of the usual parasitic denizens of a dirty hen-house. We could detect immediately upon entrance that the house was literally alive with insect life; for the parasites peculiar to poultry give off a most unmistakably disagreeable odour when they accumulate to a great extent. Such, however, was the condition in which we found the poultry-house.

Next, as to feeding,—well, they were fed *occasionally;* but we could not get a satisfactory answer as to whether they were fed once a-day or once a-week; the fact is, they were only fed when their very poor existence was clearly remembered, and that was by no means certain, as upon inquiry we found John, the house-lad, sometimes did it, the cow-man sometimes did it, or if the foreman *thought of it*, he did it. As to cleaning them out, why none seemed to know when that feat was last accomplished, or whose duty it was. Certainly it appeared to have been months since that operation had been performed. All these negligences were in themselves bad enough, but when we came to inquire how or where the chickens were hatched and reared, and found that no person knew, or cared to know anything about them, we could not help uttering an exclamation of disgust, which was added to in effect when we heard that if any chicks were hatched, the hens brought them in with them from the hedges or under the stacks, from clean natural nests which they had been forced to find for themselves through the dirty infected condition of those at home. The horses and dogs were cleaned properly, and at stated times daily; the fowls never. All the animals on the farm were fed at stated times daily, the fowls scarcely ever; and yet the poor fowls were expected to yield a certain amount of profit, not in relation to their cost, or for any adequate return for labour expended, but simply because they formed a portion of the whole stock in trade of the farm.

It appears to be a common notion amongst farmers that fowls don't pay, but they cannot prove it to you or themselves if you ask for figures. It also is perfectly common to them to believe that fowls do not require hand feeding, and being like the birds that fly in the air, they should keep themselves in as good condition. Another terrible delusion from beginning to end. True it is that their progenitors, the *Gallus Ban kiver* live and thrive in a perfectly wild state, and rear a certain family every year; but our short-sighted farming friends should enquire how many eggs the wild birds lay, and how many the domestic one. The first rarely more than twenty-four eggs in the season, and never more than two broods, whilst the latter will lay variously from 150 to 250 eggs per annum. Here, then, is the real solution to the simple question. That the fowl in its natural wild condition, subsisting only upon what it can scratch and pick up, lays only twenty-four eggs, whilst the sport from the same stock reared and fed regularly, but somewhat artificially, will lay 200 more eggs per annum.

It has been said that, in man, "Cleanliness is next to godliness," and surely that may be taken to mean profit to the soul; and cleanliness to dumb animals, of whatever kind they be, means profit to their master. Another source of evil in neglected poultry-yards is the want of properly-constructed covered retreats for them to run to in inclement weather. The cattle in general have all their loose boxes, or byres, or sheds, in the fields, in which to retreat from the cold and wet; but the fowls have none, and the roosting-house being so dirty, dark, and infested, they prefer to huddle up together close to the wall, or under some old cart with the bottom out, or under the eaves of a stack. At this really busy time of the year, or which should be, all these rational points should be immediately looked to; and our advice to the bailiff of the farm was, stop up every crack in the walls of the house; put in a good sliding window close up to the eaves of the roof, 2 feet 6 inches long by 18 inches wide, so that it can be opened when required; put a lock on the large door, and make two small entrances for the fowls at either end of the house; remove all the wooden nests from the walls and burn them; thoroughly scrape out the whole interior of the building and every crevice, and brush them out with a hard bass brush; procure some unslaked chalk lime, mix with water only when ready to apply it, and put a teaspoonful of pure carbolic acid in the pail, when it may then be applied whilst boiling hot.—*Land and Water.*

THE IMPROVEMENT OF FANCY POULTRY.

the *Albany Country Gentleman* there ppears the following remarks from a pondent :—

s a notorious fact that there is a general laint of poor success with fancy breeds vls, shewing that instead of there being at improvement of late in the quality, have become in many instances almost s . for the important purposes for . poultry are supposed to be used. g looked for the reason of this general laint, I find it has two principal causes ase and careless breeding. In almost yards I have visited, I found the roup oing the greatest harm, so much as to st many from ever keeping this sort of again. It is a great pity that there l be no certain way of getting free from arful disease; many have thought they rid of it, when suddenly it has broken ith renewed violence. One person says ice sold and killed off all his fowls, built ouses, &c., and bought no fowls but that red in the soundest health; in fact the were all laying; and in another case the on a new place raised all his fowls from purchased, yet both have the disease g their poultry badly, and there is no doubt mind but that the offspring of roupy are not only pretty sure to be diseased, uch more liable to die than others when ed with it. Some who have not been led with this disease have been visited hicken cholera or gapes, which carried ore and faster than roup. Diseases as these, of course, will prevent any bird prolific, and as the first often lingers months, and in fact becomes chronic, uld not cause surprise if hens that were before should never lay again after g the roup; but if after a severe attack hould lay, breeding from such, or any that have proved inferior in quality, have a bad effect and cause deteriora- yet this practice is much too common.

That selection which Nature had provided for in the wild fowl is no longer allowed; sometimes in consequence of scarcity of stock (many commencing with a pair or trio) they breed from all, instead of a select few that have proved stout and healthy as well as prolific.

It is not every one who undertakes to keep fowls that is a good judge of them; yet it is quite as necessary to cultivate an eye for poultry, as it is for a horse, in order to breed up to the best form; and neither should we rely upon our own judgment alone, for often fine feathers will deceive us, and stock selected to breed from be wanting in stamina or pure blood, the offspring, in consequence, being quite inferior to our expectations.

I have selected fowls sometimes that appeared to have the most desirable points of colour, against my better judgment, whereas, if two cocks were to be chosen from, one having the finest feathers, the other far superior in strength, vivacity, and courage, the latter should most certainly be used to breed from, especially when both are equal in purity of blood; thus I have seen both Derby and Silver Duckwing games produced of the highest excellence, both in colour and form, from cocks that were not perfect black breasted, and rather poor in shade of plumage.

Let it not be supposed I would here advocate neglect of points in breeding—I only intend to shew that it is necessary to have considerable knowledge of the subject to breed with certain improvement. I say I would not rely upon my own judgment alone, as to which was the best fowl to breed from; I would rather call in to my assistance that pugnacity which was given for a natural selection, and use the one which could stand a fight the best (in a natural manner), it being pretty sure to shew if there is any strength of constitution wanting; for a fowl, in my estimation, would not improve the stock much if not able to stand a pretty hard battle. In trying this experiment, it is well to muffle the spur if sharp and long. It will be noticed as a rather singular circumstance, that this selection would lead us to choose very often the smaller cocks to breed from, which to a novice would appear quite wrong to do with such fowls as the Dorkings and the Asiatic breeds; yet the result will always be satisfactory in the end. The birds, even with these, are more shapely, vivacious, better layers and breeders, and altogether much better looking.

As for size, I would rather take my chances with a smallish cock with great vigour and fine form, matched of course with large hens free from defect, than by keeping always the largest and best marked alone to breed from.

THE

COUNTRY GENTLEMAN'S MAGAZINE

MAY 1872

LABOUR SAVING.

THE saving of manual labour in farm-work, always desirable, has now become a matter of necessity. The demand of 33 per cent. advance on wages by the agricultural labourer, is one so extraordinary, that farmers, in justice to themselves, must endeavour to get inanimate objects to perform, under the guidance of a few skilful men, adequately, what many unskilful beings have failed to accomplish properly, viz. :—the thorough disintegration of the soil, to begin with, and afterwards the cleaning and reaping of the plentiful crops which, from thorough pulverization of the land, are sure to ensue.

It has been recommended, in consideration of the labourers' strike and the increased wages demanded—which farmers cannot afford—that there should be a combination on the part of the occupiers of farms to attack the landlords on the matter of rent. The suggestion is insidiously enough made, but it is utterly impracticable. The high rents are due to the plethora of customers, the land, as we have before pointed out, is not elastic—as the field for labour is—and farmers, as a rule, are too sensible to strike even when, as tenants-at-will, they might be able to do so. Men with nineteen or twenty-one years' lease cannot go into such a union without violating the contract they have executed. It is open, however, to all to express to their landlords, that altered conditions in prices of produce, in labour-bills, &c., render them unable to pay, out of the returns of the farm, the rent which they considered at the time of taking the holding, could be fairly given. Landlords, as a rule, are by no means the "harpies" that they are occasionally represented to be. There are undoubtedly some of the class that deserve the cognomen; but the rinderpest years proved that proprietors were willing to share the sad burden of loss with their tenants. The interest that land yields is comparatively small, and it is quite conceivable that landlords might be obliged to say to their tenants, in some cases, that they could not afford to lower the rental. But we believe a grievance fairly represented, and an appeal for relief by farmers to their landlords, would seldom be made in vain. As an instance of this we may refer to the case of Lord Radnor last week, who immediately offered to meet his tenants half-way, in order to improve the condition of the labourers.

What we desire to point out in this article is the fact that in many districts of this country there are too many hands at certain seasons of the year; but the farmers, needing them at certain other periods, employ them throughout the whole twelve months. In such circumstances it is only fair that the days of comparative idleness and of work should be averaged. The men, failing to see this, strike; and what the farmers must do—the demands being beyond what the profits of the farm allow—is to direct their attention to labour-saving machinery.

Within the last twenty years wonderful appliances for "field and fold" have been introduced by the ingenuity of agricultural machinists. The skill which constructed and improved the reaping machine and the steam plough can be drawn on now that the necessity has arisen for dispensing with as much manual labour as possible. The crude instrument which *clipped* the corn in the Carse of Gowrie a-third of a century ago, is the germ of our self-delivering reaping machines; and we have faith that the time is not far distant when the sheaves shall be bound as they fall from the raker. There is nothing improbable in the belief entertained by one of the most practical and successful agricultural implement makers in the North, that, in the course of events, the intelligence of man will secure the abolition of manual labour altogether—that all he shall have to do will be to regulate by his hand the machinery which the brain gave form to. The Applegarth machine was a wonderful advance upon all the printing machines that preceded it; the Hoe-modification and transmogrification, was a long way ahead of it; and now the Walter machine has shot far over the heads of both in the saving of time and labour. The improvements made in what we may call the printing field will yet be made in the green fields of the country.

Very many years ago, Mr Wren Hoskyns, in that delightful book, the "Chronicles of a Clay Farm," wrote that the correct motion of steam-driven machines was rotatory, and referring specially to ploughing by steam, observed:—"What has the laborious dragging of a plough to do with steam mechanism, whose mode of action lies in rapid revolution which, applied behind your locomotive (which must travel forward on the hard soil), could cut a trench 1 foot deep, and with its case-hardened tines rasp away the soil from the land-side to any pattern of fineness, as easily as a saw can cut a board." Further on, he illustrates the waste of employing "a steam engine to turn a drum, to wind a rope, to drag a plough, to turn up a furrow, and all this as a mere prelude for an after amusement to all the antient tribe of harrows, scufflers, rollers, and clod-crushers, to do supplementally the real work of cultivation, it reminds one of the "house that Jack built." Once more he says:—

> Why poke an instrument [the plough] 7 or 8 inches under the clod to tear it up in the mass by main force, for other instruments to act upon, toiling and treading it down again, in ponderous attempts at cultivation wholesale, when, by simple abrasion of the surface by a revolving toothed instrument, you can perform the complete work of comminution in the most light, compendious, and perfect detail. Imagine such an instrument, not rolling on the ground, but performing independent revolutions behind its locomotive, cutting its way down by surface abrasion, into a semi-circular trench about 1½ inch wide, throwing back the pulverized soil (as it flies back from the feet of a dog scratching at a rabbit-hole): then imagine the locomotive moving forward on the hard ground with a slow and equable mechanical motion, the revolver behind with its cutting points—(case-hardened) playing upon the land sides of the trench as it advances, and capable of any adjustment to coarse or fine cutting; moving always forward and leaving behind granulated, and reverted by its revolving action, a seed bed 7 or 8 inches deep, never to be gone over again by any after implements, except the drill which had much better follow at once, attached behind, with a light brush harrow to cover the seeds.

Such a machine as that foreshadowed nearly twenty years ago by Mr Hoskyns, we had the opportunity of seeing at work the other day in a miniature form. In the absence of an engine the apparatus was wrought by hand-power. The piece of ground upon which it was tested looked as hard and compact as a road which one of Aveling & Porter's engines had rolled, but the little machine, cutting to a depth of 4 or 5 inches, turned over, or, rather, disintegrated the soil in a manner impossible to be excelled. Finer seed-bed could never be made by spade or fork. Following the "Cultor"—the name the patentee has given to the new machine—came a drill-drawing implement, which did its work with unerring regularity, and after followed a roller or leveller. The operation was really wonderful, and so far as we can judge, under fair weather conditions, nothing need hinder the cultivating and seeding with the "Cultor" being done at one and the same time. It seemed to move pretty easily along the ground, considering its compacted state at the time of our visit.

"Cultor" is composed of an engine of ıl lightness, with a boiler of peculiar uction, the invention of the patentee, ıgine only weighing 2 tons, and the conserving the heat, it is stated, better .ny other in the market. It is claimed team can be got up more quickly than er apparatus of a similar kind, and that uel is required. The pulverizing ma- is fixed underneath the engine, and the onal weight of this is set down at ½ a- nore. The acting disintegrating points "Cultor" consist of pendant cast-steel s, affixed in a rim or periphery under- the engine. "The lateral edges of the s penetrate the ground to, say, about f an inch, as they come progressively cut, and as the "Cultor" is drawn forward each knife advances in succession and traverses its line of progress, and in its circular path passes out of cut on reaching the widest diameter of the circle it describes." The depth that the "Cultor," doing 10 acres per day, is expected to accomplish is 8 inches, and every particle of the land to that depth, it is undertaken, shall be made into the finest mould. The estimated cost per acre is 2s. 9d. The original cost of the "Cultor" is £450.

If it can do its work in the same style as the illustrative machine we saw perform, it will create quite a revolution in farming, and enable agriculturists to dispense with a large number of comparatively useless hands, and to pay better the more intelligent they employ.

THE FARM SERVANTS IN THE NORTH OF SCOTLAND.

OR several years the position of the agricultural labourer in the northern ties of Scotland has shared the attention rious Farmers' Associations, as well as of te individuals, and recent events in wickshire, and other parts of the country increased the concern of agriculturists in matter. Those who have publicly sought nprove the condition of the husbandmen he north, have generally advocated the stitution of a well organized system of stration offices, for the feeing or hiring ket. But any one intimately acquainted the status and habits of farm servants t be aware that this change will neither asily nor speedily accomplished, and also it will only be a partial means of securing desiderated end. To obtain what is ost universally desired, the whole position he farm servant and his relations to his ployer must be fully and carefully con- ered.

n the counties of Aberdeen, Banff, Moray, rn, Inverness, and Ross, to which these es in particular apply, about forty years ago ploughmen's wages ranged from £3, 10s. to £5 per half-year, with rations—or less than half present rates, while the wages of "orramen,"* boys, and women, for agricultural work, were correspondingly small. In those days some articles of clothing were almost as costly as they are now. In spite of the small wages and the dear clothing, the proportion of hired labourers who saved money in the days of our fathers was much greater than it is now, or has been for twenty years. This remarkable fact is difficult to digest by the superficial observer, and to account for it makes those who give the matter more attention pause and ponder. We are convinced it must be due to a series of circumstances, the more prominent of which we shall enumerate. The holdings in antient times, as is well-known, were more numerous and much smaller than was afterwards the rule, consequently fewer hired labourers were required on one farm. The tenants and their families did more of the farm-work, and mingled freely with the servants—worked generally side by side, sat at the same table, and enjoyed almost the same advantages, physically, socially, and morally. Luxuries in the peasant ranks, it is true, were then comparatively unknown, but practically there was no gulf between the hired labourers and the sons and daughters of the farm in the upper districts of these counties, and only a very small breach in the lowlands or more advanced agricultural localities.

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* "Orramen"—a term applied in Scotland to men engaged on odd or general work on a farm.

Regular hours of daily labour were unknown, and much of the heavier work latterly accomplished by machinery had to be done by manual power. The dietary in the farm kitchen was neither of so tasty nor so nourishing a nature as was afterwards general; but the simple fact, that in all these respects those whose servants they *nominally* were, bore almost an equal share of the burden, precluded any idea on the part of the employed that his condition was otherwise than satisfactory. Matters thus moved smoothly for many years. Male servants, on the whole, were not subjected to so much drudgery as females. Ploughmen, in addition to the field operations, had to thresh with the "flail" morning and evening throughout the winter and spring, threshing mills being then few and far between in the midland and inland parishes. In a few cases, "barnmen," *i.e.*, men who worked all day in the barn, were employed, thus relieving the ploughman; but these were exceptional cases, the horsemen and orramen having, in the great majority of instances, to rise every morning, at different periods, from three to six o'clock, and labour hard at the "flail," or "devil's drum-sticks" as its many enemies called it, till eight or nine o'clock, when, after breakfasting, they were ready for field or other farm work during the seed-time, harvest, and other busy seasons; from twelve to seventeen hours work a-day was the ordinary limit, and yet there was no complaint. There can be no doubt the peasantry of these highland districts were more muscular early in the present century than those who succeeded them, but comparing the limit of physical endurance of the latter, with the fully taxed capacities of the former, one naturally wonders how the hind of old bore his crushing burden so manfully. Such was the spirit, however, of many of the forefathers in the humbler walks of life, that they seldom even admitted being fatigued. The children of very poor parents entered the hire-house, to "sair the frame," as it was termed, at a very early age; often before they could read fluently or write legibly, but in some of the far highland glens the families of a few small farmers and crofters were almost at maturity before the agricultural harness was regularly on them.

About very few of the farms was there anything like a systematic allocation of the work, such as was subsequently introduced. The female servant at the farm literally earned her bread "by the sweat of her brow." Only a few of the larger farmers afforded a hired female for household employment entirely, the general practice being for the women to work in the field or at the steading, along with the other hands, from eight to fifteen hours daily, according to the season and the nature of the operations, and then do the duties of the kitchen in the evening and morning. In the days of small farms and inferior farming, the work of the household was regarded as mere play by the employers of these general plodding servants—the female agricultural labourer of the period. The meal hours were not very regular. Breakfast was generally about eight o'clock, dinner about two, and supper about eight, sometimes ten. Breakfast often consisted of beremeal porridge, with buttermilk and berebread. At one time porridge made from oatmeal was rare, and sweet milk with oatmeal cakes were still greater rarities. For dinner, "kail and kail brose" were not uncommon, and "whey brose," potatoes, turnips, "hasty brose," now and again asserted their position on the table. Kail, turnips or potatoes were prepared for supper sometimes; the first named being common in spring and early summer, potatoes in autumn, and turnips in winter. Substituted for these not unfrequently at supper, were and sowans.* The table of the antient kitchen, or even parlour, truly seldom ıed under many dainties. Tea and sugar evidently little indulged in.

ıen really good servants fell to the lot of ving masters, shifting at the term was :are, and there was generally an absence sunderstanding or ill-feeling between the :s. The servants being anxious and nt in their master's interest in fair and nable weather, the latter avoided expos- ıe former to bad weather. Employed : fields only in fine weather, the servants' ng served them longer than they would otherwise done, and being so much sticated, their habits were generally of a r character. In fact the more steady loing servants scarcely spent a sixpence ıt on indispensable articles of clothing, ich they were very careful. They were enabled to save fully the half of their ıgs—about £5 a-year. In not a few to which we could point, these savings ıulated to enable the owner to possess lerately sized farm. From this source, of the best practical farmers of the ıt day spring.

: changes were at hand. A better sys- f land cultivation crept gradually over ountry. Farms became larger, two, four, and five of the smaller holdings, ıich we have been speaking, were by by turned into one possession. Im- d implements were manufactured for n the farm. Artificial manures were uced, and various other circumstances ed up to invite and facilitate a more ıgh system of tillage. Servants ulti- r demanded and obtained higher wages y step, until, by 1860, they were getting : the rates they were well pleased with r years earlier. This was not all—they d on a limitation of labouring hours, they also secured, but with consider- lifficulty. The erection of threshing driven by horse or water power, and ecently by steam, relieved the men of the "flail." The introduction of the sowing machine saved them the somewhat hard toil of sowing, and the reaper has freed them to a large extent from the oppression of the scythe; while the opening up of the country by railways has abolished much of the night or extra work which the carting of the farm produce on long journeys involved. For a considerable number of years, farm servants have worked only ten hours a-day, and even in cases of emergency many of them declined to do anything for the farmer beyond this limit.

On the other hand, as land cultivation improved, the servants were more exposed to the stormy blasts during the regular working hours, and the farmers and their families associated less with the employes, the latter doing the most of the work. The majority of occupants soon got into a better position, and so the gulf which has for some time divided the two classes gradually widened. The one party's sympathies with the other are much feebler than they should be, or than they were a-quarter of a century ago. For this state of matters both classes are blameable. It was impossible that the farmer or his family could in every case maintain the respect of the servants, while the former were holding themselves so much aloof from the latter. Even gradual as this process of isolation was, many of the better class of servants felt it keenly, and as a matter of course stuck up more rigidly for such "rights" as they believed they legitimately had. Let it not be understood that we find fault with the families of the farmer for seeking to raise themselves, as soon as circumstances permitted, to a higher social platform than that on which the hired labourer of old figured. On the contrary, this ought to be commended, but what we do complain of is, that the employers, or many of them, once raised themselves, offered so little encouragement to their humbler fellow-creatures to elevate themselves in the social and moral scales. Some bad servants certainly did not stimulate the farmer in this matter, being so little alive to his interests, but it was hard that the more valuable, deserving labourers should have

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vans—a dish made of the inner husks of oat- mented, and boiled into a pasty consistency ith milk or water.

been so far neglected on this account. Exceptions will be found to this rule, as there are several farms in the north on which the master and some of the servants are on amicable terms—where the most cordial relations subsist.

Though wages are high and working hours short—and in both these respects coming events are likely to turn in favour of the servants—it is very doubtful if the prospects of the field labourer are as brilliant as they were less than half a century ago. At the latter period, temptations to spend money in their circles were few, and those disposed to waste their earnings were still further in the minority. With a few spare pounds in his pocket then, a farm servant of ordinary qualifications had a fair prospect of getting a small farm to rent, on which he could comfortably spend the afternoon of his life. Several of the servants married the farmer's daughters, and through such connexion, if for nothing else, the assistance of the older tenants and masters could be relied on in the hunt after an occupancy. The gradual, but now considerable divergence of the two classes, together with the increased size of farms and enhanced value of every description of live stock, involving the possession of a much larger amount of capital by the aspiring tenant, have practically placed the tenancy of land beyond the grasp of the ordinary ploughmen. In these days, therefore, of costly farming, of very few crofts or small holdings, and the divided state of capital and labour, it will be seen at a glance that, be the present condition what it may, the prospects of the farm labourer in the north of Scotland are not very bright. The experience of every year goes to shew that the amount of capital required to cultivate the soil in accordance with the spirit of the age has not reached the maximum yet; and as only a small proportion of the ploughmen can expect to save as much in their younger days as will keep them after they are unable to bear the harness, not to speak of putting them into a farm, the only alternative for a majority is to spend the evening of a toilsome life in the poor-house. For indifferent servants this usage is sufficient, but for those who have laboured many years faithfully and earnestly in their master's interest, such a prospect is as gloomy as it is unmerited. That some better provision should be made for those who have long and truly borne the agricultural yoke, we shall afterwards endeavour to demonstrate.

AGRICULTURAL LABOURERS IN EAST LOTHIAN.

AT the present time, when there is so much agitation in England regarding the wages of agricultural labourers, it may be interesting to our readers to give a few particulars regarding their position in East Lothian.

Nearly every farm in our county is provided with ample cottage accommodation for the people required to carry on the farm labour. Much interest has been shewn in this matter by all our large proprietors. The old thatched cottages, with their single apartment partitioned merely with the box-bed furniture of the occupants, have entirely disappeared, and comfortable brick partitioned houses, with two or three rooms, erected in their stead. In all matters requiring reform, there is nothing like beginning at the fountain-head, and in improving the houses of our people, we lay the foundation for improving the moral status of the people themselves. We remember, some years ago, in conversation with Mr Culley, who was then one of the Commissioners appointed by Government to inquire into the condition of the rural population in Scotland, hearing him express his surprise at the large cottage accommodation attached to every farm. He told us, that in England many large proprietors refused to build houses on the farm, because it would give the employer too much power over his people, and they preferred that they should live in villages, independent, so far as housing was concerned, from their master. Now there can be no greater mistake than this. We told Mr Culley the engagements made with our men were either renewed or broken off at the end of a year, and we give him scores of instances where the men had been in the same service for many years, some of them from father to son. We view an agricultural strike as a serious national calamity, entailing irreparable loss to every condition in the State, and the only way to obviate these agricultural shipwrecks is to build houses for the people on the farm, and let the employer make his engagement with his labourers at a fixed rate of wage with a house for the year. Let there be no locking out, no strikes occurring at the most important season of the year, a continuation of which may soon convert the finest district into a wilderness.

In East Lothian, if the necessities of the times require an advance, the thing is quietly gone about, without the loss of a single hour's work. It is managed thus—the speaking time for engaging our men is about the end of January or first week in February. There is a large hiring market held in Haddington on the second Friday of February. All farm-servants wishing new engagements attend this market. The term of removal, or flitting, is the 26th of May, about fourteen weeks after the new engagement is made. This may be objected to on the ground of a servant being too long in his master's service after knowing he was to quit, but experience has proved this to be no disadvantage. A man is often smartened up by the knowledge that he has to leave, and seldom fails in any part of his duty, and it allows ample time for all the *pro's* and *con's* of the new engagement to be thoroughly adjusted.

At the hiring market in February last there was some stir amongst the people—a rise of wages was asked and at once granted. The rise may be taken on the average at about 30s. or £2 for the year. In the event of a very large increase of wages being asked, and employers refusing to comply, the long interval between the speaking time and the period of flitting would have allowed ample time for employers to make other arrangements.

We will give first the wages of the ploughmen, or hinds, as they are called. A ploughman and a pair of horses is required to work 50 acres of land in East Lothian. In former times 60 acres was allowed for each pair; but in these days, from the very large increase of farm produce and extra quantity of manures applied, the carting work is nearly doubled. The ploughmen are engaged at a uniform rate of wages for the year, as follows:—

A free house, with a small garden attached; all their coals are driven for them, and they are allowed to feed a pig from the refuse of their houses and gardens. Men receive £20 in money, or £14 with permission to keep a cow; 6½ bolls of oatmeal—130 stones; 12 bushels of barley; 4 bushels of beans, and 1000 yards of a drill of potatoes. In the event of illness their pay continues unless it is protracted over six weeks, when they begin to receive an allowance from benefit societies.

This year the wages of a ploughman may be converted into money, thus:—

*Money	£20	0	0
†Oatmeal	13	0	0
Barley	2	17	0
Beans	1	4	0
Potatoes	4	0	0
Coals driving	1	5	0
Cottage	2	10	0
Harvest food	1	10	0
	£46	6	0

This gives a total of somewhere about 17s. 9d. per week for the year, of course the farm produce portion of the wages varies according to the price of the current year. In order to avoid the fluctuation in the prices of farm produce, some of our men prefer being paid entirely in money, at the rate of from

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* With cow's keep £14.

† The oatmeal is here taken at current prices, the average may be less.

12s. to 13s. per week, in lieu of the £20 in money, oatmeal, barley, and beans.

Oatmeal is not used to anything like the extent of former times. The greater portion of it is sold by the men to our local millers. On every farm, besides the regular ploughman, we have two or three of what are called "orra men," who receive the same wages as those who drive horses. A very great portion of the out-door work is done by women. We will give their gains during the year, in our next.

PROGRESS OF IRISH AGRICULTURE.

AT the banquet given by the Royal Dublin Society last week, the Lord Lieutenant, in reply to the toast of "Prosperity to Ireland," delivered an interesting speech on Irish agricultural improvement during the last two years. The Lord Lieutenant congratulated the Society upon the character of the show, and the interest taken in it by the public. The success of the show, he observed, was only a reflexion of the prosperity of the cattle trade, which was never more flourishing than now. This was proved by the agricultural statistics, from which it appeared that though sheep had decreased between 1870 and 1871 by more than 100,000, cattle had increased by 170,000, and swine by 155,500. A still more important proof of its prosperous state was the fact that the export trade had largely increased. The number of cattle exported to England was greater by 29,900 odd. There was also an increase in the export of sheep to the extent of 63,874, and the large increase of 105,132 in swine. That shewed the confidence of England in the Irish market, and the sound condition of the animals. The Government had sometimes been blamed for putting restrictions on the removal of cattle, but the returns shewed that they had not injured the prospects of the trade. In England, on the other hand, cattle had decreased by 65,559 in 1871, compared with 1870, and sheep by over a million. The only increase was in swine, and that was very large. He thought that the decrease of stock had something to do with the high price of meat, of which they heard so much. The trade was of great importance to Ireland, and he hoped that Irish farmers would tend their cattle with care and look after their health. It was sometimes objected to the Society that it did not encourage the small farmers, who were a most numerous class, as he proved by shewing that out of 638,834 agricultural holdings in Ireland, 317,417 were valued under £8 a year. He distinctly denied that the Society had given no encouragement to that class. It was true that the small farmer could not afford to come to Dublin to compete, but every good animal which went down to the country improved the quality of the stock in the locality, while it encouraged the large farmers to send their cattle up to the shows. He also denied that those who encouraged the increase of cattle of Ireland were promoting the "illegitimate conversion" of tillage land into grass. Scotch farming shewed that increased cereal crops required a proportionate increase of stock and sheep. The Society encouraged the tillage farmers as much as the grass farmers, by developing the breed of cattle. His Excellency added that in order to shew his practical interest in the encouragement of small farmers, he had, through the medium of the National Board of Education, arranged a scheme for giving prizes in each province, to be competed for around certain districts where school farms had been established. At Glasnevin, there was a remarkable instance of what could be done with a small farm. Among the different systems tried there was one upon a 5-acre farm, and the result was a net profit of £50 or £60 a-year. This is an illustration of what an Irish farmer might do.

PORT AND EXPORT OF AGRICULTURAL COMMODITIES.

E Trade and Navigation Accounts for Iarch, and three months ended March ve been issued. A wonderful falling aken place in the importation of cattle, lly in oxen and bulls, which only 4837 as compared with 11,607 in the onding month of 1871. The cows were wer in number, viz., 2141, as against Taking all classes of cattle together, are presented to us in the Returns, ulls, and cows, we find we are defi- out one-half, the total receipts being st month, to compare with 13,895 in period of 1871. The short supplies road probably tend to keep up the f beef and mutton at home, which are y exorbitant. Dear as the meat ap- London, however, it is not so high as large manufacturing towns—Man- Birmingham, and Liverpool. In fact, traders from these places to come and e in the London market. Dealers in rth complain that they do not get so r their cattle at Copenhagen fields as at their own local markets. And it ble, unless things alter, that we shall ven fewer beasts from Scotland than recently had.

importation of sheep and lambs was rably larger last month than in the onding period of last year, the number 82,611, as against 52,456. The we paid for live stock, including and swine, during last March, was ss than in 1871—only £287,701, as £353,251. But while we paid much live stock, we paid a greatly increased r dead animal food. Our outlay on article of bacon last month was two- ore than we paid for animals reaching ores alive, viz., £576,994, nearly oo more than in March 1871. The mount expended in the month for cles enumerated above was £864,695. ear, in the same time, the sum disbursed on similar commodities was £693,769. In the three months that have passed we have expended on live stock and bacon £2,169,257; in the first quarter of last year we paid only £1,396,253.

These figures, gigantic as they are, by no means represent all that we have spent upon stock and its produce. In the course of the three months of the year that are passed, we paid for beef, salted or slightly salted, £169,036; for butter, £1,341,866—£200,000 less than in the same period of 1871—and for cheese, £275,672, which is not half the amount that went out of our pockets during the first quarter of last year. In the course of the three months the import of eggs more than doubled. This increase over last year's first quarter is to be accounted for, to a considerable extent, by the deficiency occurring on account of the Franco-German war. The prices remained at much the same figure as last year. The total sum expended up to the end of March for eggs was £377,747, as against £169,961 in the like term of 1871. For hams we paid £122,885—in round numbers, £54,000 more than in the first quarter of last year. The "harvest of the sea," in foreign parts, was not gleaned by us so assiduously during the quarter as it was in 1870 and 1871, fish costing us only £85,000—we leave out the hundreds—as against £188,000 and £88,000 respectively. Preserved meat is becoming quite a feature in the market. The value of the quantity imported up to the end of March this year was £217,407, as against £109,492, as nearly as possible double, and our colonial manipulated meat is becoming so highly appreciated that we expect to see the present large imports trebled before another twelvemonths go round. Salted or fresh meat from abroad, not previously spoken of, we imported to the value of £51,096, which was twice as much as we purchased in 1871. Pork fell off greatly, the amount we paid during the first quarter of this year being only £200,883 to compare with £363,318 in the corresponding period of 1871. For poultry, game, &c., we paid £9000 more in the past three months than in the first quarter of last year, the sum being £45,921. Taking all these figures together, with the exception of the produce of the sea, we find that in all we had expended on animal food and eggs, up to the end of March, no less a sum than £4,871,770. Surely this is too much for a country so well adapted for the growth of stock and poultry as our own.

Turning to breadstuffs, we find that there was an increase in the imports both on the month and quarter. In the longer period we received 8,745,152 cwt., to contrast with 7,610,450 in the corresponding period of last year. The respective costs during the quarter were £5,149,060 and £4,395,852. There is a very large increase noticeable in the imports alike of barley and oats in both terms for which the Returns are made up. At the end of last month, the quantity that had reached our shores since the beginning of the year, was 3,985,048 cwt.; in the same time of 1871 only 1,477,986 cwt. were purchased. Oats also were in much greater demand both in the month and three months. In the latter period 2,375,614 cwt. were landed, as against 829,185 in the corresponding term of last year. The following table shews the quantities of grain received, with the values, and the countries from which they came:—

QUANTITIES.

Wheat.	Month of March 1871. Cwt.	Month of March 1872. Cwt.
Russia	1,732,538	1,640,396
Denmark	5,990	14,643
Germany	214,053	239,866
France	—	6,090
Austrian Territories	28,602	1,241
Turkey, Wallachia, and Moldavia	74,705	53,021
Egypt	31	172,735
United States	537,017	556,966
Chili	—	32,627
British North America	4,350	11,030
Other Countries	31,400	49,349
Total	2,628,686	2,777,964

VALUE.

Russia	£986,462	£926,657
Denmark	4,080	9,284
Germany	142,299	158,868
France	—	4,117
Austrian Territories	18,252	775
Turkey, Wallachia, and Moldavia	44,363	25,978
Egypt	25	87,672
United States	314,785	349,298
Chili	—	22,674
British North America	2,501	7,680
Other Countries	17,031	24,948
Total	£1,529,798	£1,617,951

QUANTITIES.

	Month of March 1871. Cwt.	Month of March 1872. Cwt.
Barley	619,244	1,561,748
Oats	459,283	842,120
Peas	51,177	31,992
Beans	202,166	281,617
Indian corn or Maize	836,287	1,470,326

VALUE.

Barley	£189,282	£614,154
Oats	191,534	306,826
Peas	22,644	14,608
Beans	92,285	111,291
Indian corn or Maize	340,316	514,908

QUANTITIES.

Wheat Meal and Flour.	Month of March 1871. Cwt.	Month of March 1872. Cwt.
Germany	97,380	89,119
France	2	23,736
United States	185,757	76,486
British North America	884	23
Other Countries	137,629	76,255
Total	421,652	265,619

VALUE.

Germany	£93,065	£83,214
France	2	23,185
United States	156,942	46,051
British North America	731	20
Other Countries	142,977	76,576
Total	£393,717	£229,046

The importation of bones has slightly fallen off in the course of the month, but there is a small augmentation on the quarter. In the month, the quantity received was 6007, to compare with 7235 tons; in the quarter, 21,441 tons, as against 18,858 tons. The decrease in guano is very marked in both periods, and it is likely to continue so, not only owing to its scarcity, but on account of its falling off in quality, and of the not over-courteous treatment which is experienced by purchasers from the Peruvian Government. The quantity received in the month was 7151 tons, to contrast with 13,687 tons; and in the three months, 25,443 tons, as against 69,274 tons in the corresponding period of last year. The amount we paid for this manurial substance, up to the end of March, was £223,827; in the like term last year we expended £808,594. Nitrate of soda is growing rapidly in favour, the quantity imported in the month being 127,275 cwt., as against 76,951 in the March of 1871. A corresponding increase was noticeable in the quarter. The amount disbursed for this fertilizer in the three months was £437,032.

Regarding feeding-stuffs: we note a considerable falling off in oilseed cakes, alike on the month and quarter. In the former period only 9247 tons reached us, instead of 14,034 tons, and in the latter 32,306 tons, against 42,991 tons. The expense in the quarter for this cattle food was £297,777, against £358,340 last. Cotton-seed was in less demand during the month, but we received it in larger quantity, taking the quarter into account; the sum paid for it in the first three months of this year was £713,576, to compare with £690,918 in the like period of 1871. There was a great falling off in rapeseed; and clover and grass seeds also were in diminished supply. In the quarter we had about ten times the quantity of potatoes we received up to the end of March last year, at a cost of £54,097, instead of £6017.

From the following table it will be seen that the imports of wool were less in the month. We may remark, however, that there was a large augmentation over the whole quarter, 85,792,388 lb. having been received, as against 74,138,014 lb.

QUANTITIES.

Wool, Sheep, and Lambs.	Month of March 1871. lb.	Month of March 1872. lb.
From Countries in Europe	1,120,710	2,367,140
,, British Possessions in South Africa ...	2,892,530	2,335,619
,, British India	2,457,717	2,679,276
,, Australia	22,729,913	19,320,605
,, Other Countries......	1,178,926	3,143,662
Total	30,379,796	29,846,302

VALUE.

From Countries in Europe	£68,400	£149,378
,, British Possessions in South Africa ...	130,786	150,808
,, British India	85,633	116,396
,, Australia	1,367,026	1,370,074
,, Other Countries......	49,116	135,770
Total	£1,700,961	£1,922,426

Our export table of articles of purely agricultural produce is a very meagre one compared with the above formidable list. There was an increase in butter sent abroad during the last three months, the sum received this year being £73,839, to compare with £61,945 last. Cheese was in less demand, the money we obtained from foreigners for this commodity being only £20,259, instead of £31,856. The demand for horses for the continent has been very inactive, both in the month and quarter; in the former period only 210 having been exported, as against 1180; and in the latter only 487, instead of 3123. The price received in the quarter was £30,193, to compare with £94,655 in the first three months of 1871.

Our exports of wool were much less in the month, but larger in the quarter, the total quantity shipped abroad in the three months being 2,919,485 lb., to contrast with 1,739,373 lb.; and the respective prices, £236,975 and £124,520.

Farm Architecture.

THE ARRANGEMENT OF FARM BUILDINGS.

By Mr J. E. Watson.

IN former years nothing perhaps was more neglected, in an architectural point of view, than the designing and arrangement of farm buildings, and I think it cannot be denied that most of the sites were badly chosen, some being on low ground where drainage—which, however, at that time was little thought of—would have been impossible, and in many cases instead of the floors being raised from 6 to 8 inches, which they ought to be, were probably sunk to that extent or more below the level of the surface, the result of which is that the floors of the buildings were occasionally standing 2 or 3 inches deep with water and liquid manure coming in from the folds. Other sites are on the slope of a hill, and the ground excavated to make it sufficiently level for the buildings, and some important parts, such as the stables, byres, or the barn, are built against the side of the thus formed embankment, with the roofs nearly level with the surface; the consequence is that the water percolates through the walls, causing the floors to be always wet and damp, and in many cases, although drainage was easy, still perhaps not attended to or thought of. Again, some buildings are placed on the top of a hill, without having the slightest shelter, consequently in stormy weather the roofs have been blown off and the cattle almost starved to death by being exposed to the bitter blasts. I have also noticed that the farm houses were sometimes placed on the low side and close to the steading, and the moisture from the folds running in waste almost to the very entrance door. And in addition to those evils, how often we see the buildings placed at one side or in one corner, instead of a central position of the farm.

With regard to the arrangement of the buildings, no care or thought seems to have been entertained for the comfort or health of the horses and cattle, or for the convenience or saving of labour of the farm servant, but have the appearance of having been placed by accident rather than by design. Instead of the straw barn being placed in the centre, and contiguous to the stables, byres, and folds, where straw is mostly required, how often is it placed in an isolated position, as if it made no matter what distance the straw was to be carried, and littered about — no matter whether the byres, stables, &c., were at a considerable distance from the folds, and the manure from them never trodden by the cattle, but merely laid up in a heap at the outside of the door, and perhaps the cattle, placed by themselves, exposed and without sufficient shelter during feeding in winter months, in wretched hovels unfit for the purposes for which they are required. I have also seen the stable and byres, with perhaps one or two hovels placed together, and the barn and straw-house in quite a different part, or at the other side of the stack-yard, with a road running between them and the stables, and probably a more modern cart-shed, with a granary above it, in some distant position, and in some cases the granary is placed above the farm-house at a considerable distance, so that the corn had to be carted to it from the barn. And with regard to the stables and byres, neither light, ventilation, or drainage was ever considered.

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ead before the Hexham Farmers' Club.

ITE AND DESIGN OF FARM BUILDINGS.

such instances as those which I have dy described, and when they are in a di- lated state, I consider it the cheapest and plan to have them taken down and new buildings erected in a modern style, on a suitable and convenient site. The thing to be considered is the site, and in sing this for a new building I am of on that it ought to be as near the centre e farm as possible, this being the proper ion for convenience. Keeping in view it be of easy access by sufficient and roads, that it should be a dry situation easily drained by taking away both the water and the water from the spouts as as the drainage of the liquid manure the tanks, and also that it should be ble of affording a good and sufficient ly of water; not to be too much exposed, n a sufficiently sheltered position; free the faults described in the sites of old ings, and to keep in view that the folds ys face the south, so that the cattle may eltered and have the advantage of the th of the sun. By attending to these s not only is expense saved, as less ex- tion is required, less labour in laying the s and foundations, and probably less nse in the cartage of the materials, but also ional comfort and convenience may be ned. In designing farm buildings I always considered compactness and sym- y the great elements of composition, by ng the parts which depend upon each as near together as possible and remov- o a separate part the buildings in which tock is housed, also to provide ample s for sufficient light and ventilation. designing and arrangement of farm ings are generally open to a deal of ism and contention, perhaps more so any other class of buildings. As improve- s in agriculture continue to advance, ble and improved buildings will still be required, and no doubt many of these ences of opinion will in course of time to exist, and a system adopted more nsonance with the present mode of ulture.

GROUPING AND CONSTRUCTION OF BARNS, BYRES, ETC.

I have endeavoured to combat with these differences of opinion as much as possible in making the arrangement, so that it can easily be altered to suit either of the systems of farming, and the form I have adopted is simple and compact, easy access being obtained to each portion of the building without being much exposed in stormy weather, as any one attending the horses, cattle, &c., can do so with comfort and little labour in comparison to that which was required in an old farm-steading owing to the want of proper arrangement and the isolated position of some of the buildings. I have always arranged my plans so that the barn and straw-house should occupy a central position, as the straw is an article in constant request; therefore the buildings, folds, &c., which require the greatest supply ought to be grouped round it as much as compatible with the size and extent of the building, and to have a direct communication with the feeding boxes, stable, byres, hovels, &c., to enable the supply to be easily kept up, and as much under cover as possible. The same arrangement applies to the turnip houses, having passages to the feeding boxes and sheds, and in some cases I would make these passages sufficiently wide for a tramway, with a suitable truck or waggon to convey the cut turnips to the cattle. The passages between the covered feeding sheds are sufficiently wide and spacious to allow of a sufficient quantity of turnips being always stored for the use of the cattle in the adjoining folds. The granaries are above the hovels for the sake of ventilation, extending each way right and left so as to store different kinds of corn, and having a direct communication with the under and upper barns as well as with each other, the straw-house being in the centre, the full height of both storeys, to afford space and accommodation for packing a large quantity of straw. It is essential that the barns and granaries ought to be constructed so that they may be kept free from vermin. To accomplish this I invariably have the bottom or ground floors laid with concrete cement on a foundation of broken stones or bricks, from 6 to 9 inches in thickness; the floors of the upper barn and granaries may be done in a similar manner, by laying the floors in the first instance with rough narrow battens, open at the joints to give a key to the cement work; the walls ought also to be plastered up to the window sills with a good thick coat of cement, which, as well as making them proof against vermin, is also a preventive of damp. The feeding boxes are placed in close proximity to the folds, and are well ventilated and lighted from the top with squares of rough white glass as skylights, slated in with the slates; a passage is arranged in connexion with the turnip house for feeding the cattle; the doors may be hung in two halves in height, so that the upper part may be left open when extra ventilation is required; the division railings are made moveable, so that they can be taken out when larger boxes are required. The feeding sheds are open, and made sufficiently wide for cattle to feed entirely under cover, the remaining part of the fold is open, but as contrary opinions are still entertained as to the desirability of having the folds covered, it will be seen on reference to the plan that a roof can easily be placed over the open part at a small cost, or the whole may be left open without interfering with the general arrangement. The stables, byres, &c., are placed at right angles to and at the end of the hovels, in such a position that they can without much labour be supplied with straw and fodder; the manure also can easily be thrown into the folds. In some localities there is a difference of opinion as to whether a hay loft ought to be placed above the stable; some prefer it, and imagine that without it a sufficient quantity of hay cannot be stored; others condemn it entirely. My experience teaches me to think that it is better without, and to keep the stable open to the roof, with proper ventilation at the ridge, and a few glass squares, which can be had for a trifling cost, slated in to give additional light as well as an additional degree of comfort. The Inclosure Commissioners object to lofts above the stables, and request well ventilated houses for hay attached to each stable.

THE FITTINGS OF FARM BUILDINGS.

Metal fittings for partitions of stables, also for racks and mangers, are now greatly manufactured, and if some of a cheaper and less expensive style could be adopted, I think they might be used to great advantage in stables of farm steadings. In fitting up the byres, I always recommend the partitions between the cows to be made of stone slabs, about 4 inches in thickness, and the feeding troughs of fire clay or cement. I find by experience that wood work soon goes to decay, and the stone work is more easily kept sweet and clean. The calf house is in direct communication with the byre, fitted up with pens, and properly lighted and ventilated. The piggeries are also placed convenient to the folds, so that the manure can easily be put into them. But as metal fittings are now much used, they are sometimes fitted up more in connexion with the other parts of the building. With regard to the floor, which is generally done with rough paving, I am inclined to think that the whole area of the building ought to be laid with concrete cement flooring, that for the stables, byres, &c., to be well grooved to prevent the horses and cows from slipping, the remainder may be plain; the channels can be formed without the aid of dressed stone, and it would be the means of preventing damp and harbour for vermin; the extra cost would perhaps be something like 2 and 2½ to 1 at the outset, but as no repairs would be required for a considerable length of time, compared to what is required for common paving, it would perhaps be as economical in the end. Machinery can be fitted up with the machinery of the barn in connexion with a shed and saw frame for the purpose of cutting gates, railing, &c., which are always required for the use of the farm. The drains ought to be properly laid and to communicate with each stable, byres, feeding sheds, &c., so as to convey the liquid manure into the cesspool. Drains ought also to be laid, to convey the rain water from the roofs me convenient outlet for the purpose of ng the steading always dry. The superdent's house, cartshed, workshops, &c., laced on the south side of the square, ɔack wall of which forms an excellent :n wall in connexion with the farm house. r farms can be constructed on a similar having the byres and feeding byres r one roof, similar to what an entirely :ed fold would be, having a direct comcation with the straw and fodder house, man's house, &c.; the stables, cartshed, granary above, barn, straw house, &c., ng a distinct part, but all in connexion each other. In the erection of farm ings care should be taken that the floors lways well kept up from the surface of ground, to prevent damp as much as ble.

THE COST OF IMPROVED STEADINGS: ROOFING.

.e future advantage to be gained is that uildings may be enlarged to any necesextent; in fact, by mere contraction or ısion of dimensions, may be adapted for n of any size without in the slightest afıg the design or arrangement. With d to the cost of buildings, it is generally rstood that the stones are to be had on state for the expense of winning only, hat the cartage of the materials is done e tenant. In such cases the general cost nts to something like 3d. per cubic foot. oubt there is a difference with regard to of the buildings, as a stable, byre, &c., its fittings and requirements will cost than a plain straw barn or feeding shed, king the whole into consideration, the I have mentioned is near to what the vill be; of course the advantages of different localities must be taken into consideration. Perhaps the roofing is a subject which requires most consideration, as the Royal Agricultural Society of England, at their show in Manchester, in 1869, offered premiums for the best description of roofs, and at which I was appointed one of the judges to report upon them. There were models of slate, iron, and felt roofing exhibited, and I cannot explain their merits better than by quoting from our report:—

"The period of durability of slate roofing may be stated to be at least fifty years, that of iron twenty-two years, and that of felt eight years; the first requiring no other act of maintenance than ordinary repairs; the second requiring strict attention in painting to preserve it from the corroding effects of uprising vapours; and the third, in addition to repairs, requiring a coat of tar or prepared varnish every other year to preserve it from the effects of the sun and weather. The question of economy is not, therefore, determined by the first cost, but must have special reference to the periods of duration of each description of material, for, as the roof will require to be replaced at the termination of each period, it is necessary that the principal money first expended should be repaid within such periods. The true state of the case as respects economy will be understood, therefore, by comparing the annual amounts per square of ground covered, which must be gained to repay the cost within the periods mentioned, and calculating the value of money at 5 per cent. interest, they are as follows:—Slate, 5s. 6d.; iron, 5s. 10d., with painting once in three years; felt, 4s. 11d., with tarring once in two years. Each is liable to ordinary repairs, iron and slate requiring very little indeed, and felt requiring more."

The Farm.

COMPENSATION FOR UNEXHAUSTED IMPROVEMENTS.

By Mr HUSKINSON, Epperstone.*

IT may perhaps be as well to insist at once upon the broad differences which exist between English tenant-right and what is known as tenant-right in Ireland. Although the words used are the same for both systems, there is scarcely anything in common between the two. The English system aims, in principle, to pay an outgoing tenant for work done or unexhausted manures. What is known as tenant-right in Ireland (judging from the report of the Commission on the subject of which Lord Devon was chairman) is the sale of the good-will. This payment, the committee states, depends upon no improvements, is paid even when a tenant has deteriorated a farm, and is a mere purchase of immunity from outrage, and has sometimes amounted to forty years' purchase on the rent. In fact, to take the evidence of one of the witnesses, it amounts in principle to reducing the owner to be a mere annuitant on his own property, like the owners of land in Holland, subject to what is known as Beklem-recht. Because the word used in both cases is the same, to suppose that the ideas signified are also the same, is as absurd as to suppose that before 1870 an Alsatian peasant in physique, in customs, manners, and language, was the same as an inhabitant of Central France, because they were both called Frenchmen.

ENGLISH TENANT-RIGHT.

It would be out of place to make any references to the origin and growth of tenant-right, and as the conditions differ so much there would be no benefit even if there were time, in considering the principle laid down in the Code Napoleon, which is the law in France, and partially so in the Rhenish provinces of Prussia, or in comparing our English system with what is known of the customary "Pachter-recht" in Belgium. The English tenant-right in its various forms—and it has many various forms—aim only at one principle, viz., to repay an outgoing tenant what fairly belongs to him. Thus, when an incoming tenant pays a round sum, say £500, for tenant-right, it may be divided, for the sake of clearness, into the following heads:—

1. Payment for property of the outgoing tenant left behind, such as tenant's fixtures.
2. Payment for labour done and seed supplied to the land, for which the outgoer derives no benefit.
3. Payment for unexhausted manures or improvements.

If we consider these separate items which make English tenant-right, it appears to me that with respect to the first, payments for fixtures, it is, on general grounds, advisable that the amount should not be excessive, for the sum laid down by the incomer does not return to him until he in turn leaves the farm. Fixtures, therefore, to an excessive amount, tend to lock up the tenant's capital, which ought to be profitably employed in the cultivation of the farm. With respect to the second item, payment for labour done and seed supplied, we have in this country nothing to complain of, but I think the system of half tillages, which is the custom in Surrey, and in some parts of the West Riding of York, is very objectionable. It is a system which makes a heavy tenant-right it any compensating advantage, and uselessly to lock up the tenant's capi- In the best farmed counties of England stem is unknown. With respect to the item, payment for unexhausted manures, payment which a tenant would make atisfaction if he felt sure that he had oney's worth. As a recent paper in one periodicals has stated, a Flemish farmer a moderately high tenant-right, for he o take to land in the condition which erately high tenant-right indicates. An ive tenant-right has undoubted and very objections. It limits an owner in the of tenants, and its effect on a tenant g out for a farm is either to limit his , or if he ventures on a farm where the l required is more than he can find, he er crippled in his operations or reduced rowing money. At the same time it not appear to be correct, as is some- stated, that tenant-right, as a whole, is locked-up capital. What strikes any who has to do with land in different es is the variety, the bewildering , of English agricultural customs, of which relate to tenant-right. The customs frequently do not hold through- en one county. After reading Mr s paper in the Royal Agricultural y's *Journal* on the agricultural cus- of England, and observing the variety, mes based on good grounds, some- without any apparent reason, one is d to apply to them the words of son, when he speaks of

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* Read before the Nottingham Chamber of Agriculture.

> That wilderness of single instances,
> That codeless myriad of precedents.

HAUSTED MANURES OR IMPROVEMENTS.

h respect to unexhausted manures or ements, I think all are agreed that the ng tenant should be fairly and liberally for his outlay. It is the interest both incoming tenant and the owner—of the because it is his interest to encourage farming; and the tenant, because the n forms a security for his money laid the land. At the same time I am of n that any allowance beyond what is a liberal measure, of the benefit the outgoer would have had from his outlay if he had not left the land, is pernicious in its tendency. The excess is locked-up capital which the incomer never gets back until he leaves. I think that system is best which compels the tenant to invest the least amount of unproductive capital. Supposing £50 fairly represented the benefit the outgoer would have reaped from some bought manures. That benefit the incomer receives within a few years. If for that manure it was the practice to pay £60, then the £10 excess is sunk until the incomer himself leaves. That £10 benefits nobody. It does not benefit the tenant because it pays no interest. It does not benefit the owner, because, although a fair tenant-right is useful as a security for rent, yet an excessive tenant-right, on the whole, not only limits the choice of a tenant, because, unfortunately in this world, there are more persons possessing £1000 than £2000, but it tends to reduce the rent he might receive; because undoubtedly, if much of the capital of a tenant has to lie dead he cannot afford to pay the same amount of rent as if all were productive. In calling the third item of my division of tenant-right compensation for unexhausted manures and improvements, I do not refer to what may be called permanent improvements — buildings and drainage. These ought to be done, and are usually done, by the owner, who is permanently interested. If done by the tenant they take part of his capital, and invest it at 4 or 5 per cent., when it ought to be paying him, from the cultivation of his farm, 8 or 10 per cent. The works, too, are more likely to be efficiently done by one who has not a temporary, but permanent interest in the soil, and who often has at command men whose business it is to do these things, and who may be supposed to have acquired skill and experience. The objection there formerly was, that it was hard for gentlemen who were tenants for life only to be called upon to invest part of their income in permanent improvements, has now no force. Any conceivable improvement can now, by Act of Parliament, be executed and charged on the land, the money being borrowed either of a public company or from a private individual under the Improvement of Land Act.

THE VARIETY OF TENANT-RIGHT CUSTOMS.

And now, gentlemen, as to the variety in the practice of compensating for unexhausted manures, &c. I say practice instead of custom, for custom has a technical signification. Land is held from year to year either without an agreement or with an agreement, and the agreement may have special clauses as to unexhausted manures, or it may not. If it has, those clauses determine the compensation; if it has not, or if there be no agreement, the compensation is settled by the custom of the country. This custom of the country holds unless specially excluded. Such being the case, special clauses may be deemed to have been inserted to improve upon the custom. As a matter of fact, comparing different customs and agreements, there is a very great variety in the way outgoing tenants are compensated. I will give you an instance as to linseed cake. In one part of Lincolnshire (and in mentioning Lincolnshire, one cannot help remarking that although the Scotch farmers talk so much of leases in Lincolnshire with yearly tenancies and a good tenant-right, there is as good farming as any in the world), the allowance is one-third of two last years' cake bill; on Lord Yarborough's estate it is one-third of last year and one-sixth of the year before. From an agreement in Northamptonshire, I find an allowance of one-third last year's use. In Nottinghamshire, I know farms with one-fourth last year, and one-eighth the year previous; others on the same estate with one-sixth of the last three years; another case with one-fourth of last year, and one-eighth of two previous years; another with half one year's consumption on an average of the last three. Supposing that one farmer spent in cake £100 per annum for three years preceding, leaving, whom we will call A, and another spent £100 in the last year, and nothing in the two years preceding—we will call him B. Now for the result of the various practices. A would get, depending upon which practice was pursued, £66, £49 £33, £37, or £50 in the three last cases, and B would get £33 in three cases, £25 in two cases, and £16 in two cases. Making every allowance for variety of circumstances, which in matters agricultural ought always to be done, there is variety enough here without any apparent principle regulating that variety.

THE CREATION OF A UNIFORM CUSTOM.

I must confess a leaning to the practice of half one year's use on the average of the last year as it gives nearly the highest amount mentioned to A and the least to B. I might have given one case from a standard book, which gives the same allowance to both, but I considered it so hopelessly out of accord with general practice that I omitted it. As to time it is the same. I could give you two customs, one of which gives twice the allowance of the other. The variety of custom is so great that many men have had the idea that Parliament should take measures to bring matters to a uniform basis. This subject is discussed in a well-known agricultural work. The decision is, and I think of necessity, that Parliament ought not to be appealed to in the matter. I would go further and say that it is utterly unlikely Parliament would interfere, even if applied to; for, on consideration, the difficulties in the way of compulsory uniformity are enormous. Some tenant-rights are more than others—if the high tenant-right is taken as a standard, the others must be approximated to it; if the low is taken as a standard the others must be reduced. Now what does this really mean? Take the case of fallowing crop which obtains in some counties, as an illustration. If it is to be abolished compulsorily, either of two things must happen: the tenant must be paid the difference between the amount of fallowing crop and a seed and labour valuation or not. Can any one suppose Parliament would take away a right without compensation? Supposing, then, he is paid, who is to pay him? It is not to be supposed that Parliament would compel the owner to invest money in this. It would not be reasonable to suppose it. How then is the money to be raised? Let those who raise the question of compulsory uniformity answer the question. Or take the opposite case; supposing that the usual custom of rent and rates on fallows is part of the standard valuation, then on those estates where such is not the custom the tenants are presented with the difference between the two. It would be very agreeable to the fortunate tenants, no doubt. Can nothing, then, be done to abolish customs that are admitted to be bad, and to introduce good ones? To this I say this is being done day by day. When owners and tenants are satisfied any plan is for their mutual advantage they can adopt it by agreement, and as to getting rid of bad customs they can be done by the owners when they are disposed to invest money to do it; a fallowing crop has been extinguished on many estates in Notts, by the owner paying the difference between it and seed, and labour valuation. It is to voluntary action and mutual agreement that we must look for improvement. The discussion of these subjects, if done in a calm, moderate, and temperate manner, may help mutual understanding, and that owners and tenants of land in England may ever preserve what they have now—confidence in each other, and good feeling towards each other—is my earnest wish.

SEGREGATION AND EARLY SLAUGHTER OF DISEASED ANIMALS.

FROM the widely-spread disastrous results of the prevailing epizootic or contagious diseases of horned stock, it is not unreasonable to infer that the importance of a proper system of isolation, and the principles which should regulate the "stamping-out" process by slaughter, are not so well understood as they ought to be. All powerful Local Authorities, constituted under the Contagious Diseases (Animals) Act 1869, in their dealings with the question, have declared themselves quite as much at sea as the framers of the Bill; and, in a careful survey of the working of the same, we are driven to the only conclusion that the remedy has proved worse than the disease.

The seventh schedule to the Act comprises certain regulations known as pleuro-pneumonia rules; these, for the sake of simplicity, are also applicable to "foot-and-mouth disease," excepting so far as time is concerned, and have been in operation for the attempted eradication of that malady since the Act was passed. Briefly, the regulations set forth that all places whatsoever occupied by diseased cattle shall be deemed *infected*. No animals already infected can be moved except for slaughter, and only then under special regulations made by the Local Authority. Other cattle, *not affected*, cannot be removed from an infected place except for slaughter, under orders from the Local Authority, as in the case of diseased animals.

Such rigid precautions may, doubtless, have been considered extremely wise and necessary in the prevention of the spread of disease; but practical acquaintance with the application of the rules has demonstrated, beyond doubt, that few agencies have conspired more successfully to cause greater havoc. When a dairyman or farmer discovers contagious disease in one out of a herd of cows, that he is bound by the Act to give prompt notice to the local inspector, who speedily informs him it is illegal to move any one from the area of infection, except for slaughter upon the premises, or others adjoining.

The owner then questions whether any compensation will follow his consent to slaughter the endangered herd—for he has learned that none are safe where one is present already shewing the signs of disease—and he is informed that he must bear the lo
himself. He then compares the circumstanc

under which he now begins to smart, and the result of his deliberations are somewhat of the following character:—"If I move any of my cows to places of supposed greater safety, I shall be amenable to the law; if they remain in contact with the diseased one, all will become affected, some or many will die, and great will be the loss. If I slaughter them, I shall likewise suffer pecuniarily to a large extent. There is, however, the possibility of the disease going through them in a mild form, and if they are allowed to live, the end may not be so bad as I anticipated." Being entirely his own counsellor, he concludes to accept the last condition, as hundreds have done, for wholesale slaughter is a proceeding from which even many, of anything but tender minds, will often shrink, even when only a dog is the victim. How much more when a herd of valuable cattle is at stake, we leave the reader to decide.

When foot-and-mouth disease only prevails, the consequences are rarely sufficient to cause the alarm we have briefly alluded to. As to pleuro-pneumonia of the contagious form, greater uneasiness prevails. The first, as a rule, does not destroy life, but creates a most extensive impediment to profit and progress, while expenses often are ruinous. As long as the malady exists in a benign form, the animals are rapidly affected; but now and then one poor creature out of the lot suffers worse than the rest, and during her prostration acts as a pest manufacture to all the rest. She serves to keep alive the poison-germs which, flying in every direction, infect clothes, fodder, sacks, and everything—even the very air itself—and after such an attack the creature lives to become a monument of affliction, and probably disgrace also, as far as condition is concerned.

Contagious pleuro-pneumonia furnishes similar conditions; only losses are more certain, but attended with greater delay.

In both these affections, segregation or isolation might be very profitably taken advantage of. When animals are removed from large and crowded houses, one or two sharing a special shed or airy building, there is the greatest probability that they will go through a more regular or milder course, if they do not escape disease altogether, if they are separated at once from the one first affected. Isolation also answers a most important end, when slow and protracted disease attacks one only. If the animal is alone, she may remain the only one affected, but *always* such creatures are best *slaughtered*—his or her death may very possibly save the rest.

The rapidity of infection in "foot-and-mouth disease" almost forbids the possibility of *all* escaping the malady even by prompt and efficient isolation, yet we not only secure by it more chances for the animals, but adopt the most rational means of preventing its spread over the neighbourhood, by avoiding every tendency to malignant forms, which are the most dangerous. Pleuro-pneumonia has a period of incubation varying from one to six weeks, and this slow character of the disease enables us to separate known healthy animals with greater success. But whatever is the character of contagious disease, it *always* assumes a more extensive and fatal character when animals are congregated in large numbers, particularly in such places as cow-houses generally are, which are more remarkable for every obstruction in ventilation than otherwise. A strict veterinary supervision, as pointed out by us a short time ago, would take cognizance of this question entirely; and when we hear of proper action being commenced by the breeders, feeders, and dairymen of Britain, places for quarantine and isolation of stock will be designed for each district, and contagious diseases may be limited to a minimum.

FARMING IN EAST LOTHIAN.

NO. XV.—VARIETIES OF WHEAT.

AST LOTHIAN has been long and deservedly famed for wheat—a very portion of the crops being sold for It is sent to England, Ireland, and to it every wheat growing district in Scot- The variations of soil and climate in different kinds of wheat are grown pset, in one district, the highly favour- pinion formed of any particular variety d in another. Farmers are very apt to ne wedded to some false theories on ltural matters, which practice away from would dissuade them from advancing. pplies peculiarly to the opinions formed ling the merits of the different kinds of Every one is fond of whatever he succeeds best at home, this is quite al we admit. The mistake is to think ecause it succeeds best at home it *must* sarily also succeed best elsewhere.

wish to give our ideas on the different ies of wheat impartially, and to illustrate produce per acre in grain and straw, some experiments made for the purpose.

shall first deal with the varieties which ost cultivated. Of these we place er's first, as having been longer a rite variety in the county than any On land suited for its growth we no better kind. It grows tall, the is soft, and it is easily laid. The y of the grain when it has been well d is very fine. It is a great favourite bakers. The colour of the grain is reddish, therefore it does not quite and such a high price as some of the r varieties. Hunter's wheat is adapted arpish land, which does not grow too straw. On land in good condition and for it, Hunter's wheat will yield 50 ls per acre. It weighs from 64 lb. to per bushel.

next variety, and a very popular one n East Lothian and elsewhere, is Fenton, so called from having been found in a quarry on Mr Hope's farm of Fenton Barns. Mr Hope has never sown any other kind of wheat since he raised enough to seed his farm with Fenton. The whole of his crop is sold annually for seed. The grain of Fenton wheat resembles Hunter's a good deal now, and sells within a trifle of the same price. We recommend Fenton wheat for all rich loamy land, which grows a great deal of straw, and easily laid. For producing a very large crop, the capabilities of Fenton wheat are greater than Hunter's. The most striking characteristic of Fenton wheat being the irregularity in the length of the straw. Fenton wheat shews to less advantage before being reaped than most other kinds from this cause, but any one examining a field of Fenton wheat after it is cut, will find the sheaves *eared* down to the bands; Fenton wheat will yield 56 bushels per acre without having the appearance of being a large crop, it weighs from 63 to 66 lb. per bushel. It is not such a favourite with bakers as Hunter's, but sells readily, and although it does not command such a high price per quarter as some of the fine new varieties of white wheat. What farmers *must* look to is the kind that realizes most money per acre. There is great temptation to be led away from what is most *profitable* by the appearance of what is most *honourable*, viz., getting the top price in the market. In our local experience we have found Fenton wheat the most profitable variety to grow.

The next kind we notice is Mungoswells, thus named from being propagated on that farm by Mr Patrick Sherriff. It has long been a favourite in East Lothian, where it is also known as Lady Hall's. It is more like a cross between Fenton and Hunter—the straw being stiffer than Hunter's, and the grain of better quality than Fenton. It is very prolific, and will easily yield 54 bushels per acre. Another variety, called Hopetown, was also grown by Mr Sherriff. There is not such a large acreage of this kind sown. These varieties were grown by Mr Sherriff some thirty years ago, but of late Mr Sherriff has devoted his whole attention to the hybridizing of wheat, and the propagation of new varieties. Of these, his Bearded White is perhaps the truest and most distinct. For quality, it cannot be surpassed, and on softish land in the very highest cultivation, its yield is very good. We think it would be well suited for the best soils in England. The pickle is very plump and of pearly whiteness —it also grows very tall. There is a good breadth of this variety sown in the Lothians. Another variety of Mr Sherriff's, called King Richard, is a cross between this kind and Talavera. It has a magnificent head, grows tall, with a strong full stalk. The grain bears a strong family likeness to Talavera. It is an early variety, and well adapted for spring sowing.

Of the fine white varieties we have Chiddam, Trump, and Red Strawed White. Of these Trump is the greatest favourite here. The prices given now-a-days for these white wheats are most tempting. We find from 6s. to 10s. per qr. more given for some of these white wheats than for either Fenton or Hunter, the same weight per bushel.

We come now to the Red varieties. We have Spalding, Browick, Kessingland, Lammas, and Nursery. A new variety called "Square Head," introduced from Yorkshire, seems likely to attain some celebrity. We saw a few acres of it last autumn, which by no means appeared an extra crop, the yield of which reached 58 bushels per acre. The quality of the grain is not very fine, but it weighed 63 lb. per bushel, and the quantity per acre was very much more than the crop of Fenton which grew beside it. This kind will be well tested this season, a number of farmers having been induced to try it. Browick is perhaps the greatest favourite of the Red wheats sown in East Lothian. Blood Red and Lammas Red have both given way to modern varieties. We think if farmers were to study their own interest, there would be more Red wheats sown. We had an argument one day with an eminent grower, who stated *that the bushel* of wheat from which the greatest *number of quartern loaves could be made*, was the best variety to cultivate. We said, granted, but only if it also produced a proportionately sufficient number of bushels per acre, to make it the most profitable for the grower.

QUANTITIES SOWN PER ACRE.

We have mentioned all the most popular kinds of wheat grown in East Lothian. We now come to state the quantity sown per acre. We have always advocated thin sowing. Two bushels of Fenton wheat we think quite enough for 1 acre if drilled. If sown broadcast we would recommend three, of course the thickness of sowing must depend a good deal on the varieties of wheat. To illustrate this: In making some experiments with different wheats some years ago, we took a small measure and filled it with the different varieties to be tried. We found it held 47 pickles more of Nursery Red than King Richard, the proportion being 119 to 193. It is therefore necessary to judge of the size of the grain before estimating exactly how thick it should be sown, an allowance of 2 or 3 pecks per acre should be made for grain with a large pickle. We steep all our seed in a solution of blue vitriol before it is sown, allowing ½ of blue stone for 4 bushels of wheat. This has been proved to be a specific against both ball and smut. Nothing improves wheat more than being hand hoed in spring. If sown broadcast, we then give it a single and sometimes a double turn of the harrows, and a favourable opportunity is watched for top-dressing any weak or thin looking portion of a field. It is perfectly marvellous how thin wheat recovers when it is well cared for.

The comparative trials of the different varieties of wheat which we propose to give for illustration, were made in 1868 and 1869, both remarkably dry summers. The wheat crop, in each instance, was sown after potatoes.

TABLE SHEWING THE RESULTS OF THE UNDERMENTIONED WHEATS (AFTER POTATOES), WITH THE SEVERAL DRESSINGS USED.—Oct. 1868.

Varieties of Wheats.	Quantity Sown.	Total Produce.		Nett Weight of Grain per 4 bush.	Size of Plot.	Manure applied.	Cost per acre.	Produce per Imperial Acre.		Value of Produce.		
		Grain.	Straw.					Grain, per Imp. Acre.	Straw, do., 14 lb. to st.	Total of Grain.	Straw at 4d.	Total of both per Acre.
				st. lb.	A. R. P.					£ s. d.	£ s. d.	£ s. d.
King Richard	4 bush.	20 bolls 6 st. good 5 st. inferior.	544 st. of 14 lb.	17 10	1 2 36	2 cwt. Lawson's Phospho Guano, ½ cwt. Sulph. of Ammonia, 1 cwt. Salt, ½ cwt. Sulph. of Potash per ac.	35s.	11 bolls 3 bush. sold at £2, 14s. per qr.	314 st.	15 17 3	5 4 8	21 1 11
Nursery Red	Do.	18¼ bolls good 8 st. inferior	658 st. of 14 lb.	18 9	1 2 24		35s.	11 bolls 1 bush 2 st. sold at £2, 18s. per qr.	397 st.	16 9 10	6 12 4	23 2 2½
Sheriff's Bearded White ...	Do.	17 bolls 10 st. 4 lb. good 8 st. inferior	568 st. of 14 lb.	18 7	1 2 12		35s.	11 bolls 1 bush 2 st. sold at £3, 2s. per qr.	354 st.	17 12 7½	5 18 0	23 10 7½
Fenton Wheat	Do.	21 bolls 4 st. 9 lb. good 10 st. inferior	628 st. of 14 lb.	18 1	1 2 3		35s.	13 bolls 3 bush. sold at £2, 14s. per qr.	411 st.	18 11 3	6 17 0	25 8 3
Lammas Red	5 pecks.	6 bolls 4 st. good 2 st. 7 lb inf.	216 st. of 14 lb.	13 3	0 1 35		35s.	13 bolls 2 bush sold at £2, 16s. per qr.	457 st.	18 18 0	7 12 4	26 10 4

NOTE.—*There are five ridges in each plot, 18 feet wide.—The boll is equal to 4 imperial bushels.*

EXPERIMENTS IN 1869.

Varieties of Wheat.

No. I.—Fenton.

O A. 2 R. 18 P.

Produce per Imperial Acre.

	Bushels.	Stones.	Lb.
Good Wheat......	37	2	7
Grey Do.	0	6	8

Weight per bushel, 64 lb. = 171 stones 9 lb. straw.

No. II.—Hunter's.

O A. 2 R. 20 P.

Produce per Imperial Acre.

	Bushels.	Stones.	Lb.
Good Wheat......	37	3	4
Grey Do.	0	6	12

Weight per bushel, 64¼ lb. = 172 stones 1 lb. straw.

No. III.—Trump.

O A. 1 R. 39½ P.

Produce per Imperial Acre.

	Bushels.	Stones.	Lb.
Good Wheat......	38	0	2
Grey Do.	0	8	5

Weight per bushel 63¾ lb. = 165 stones 7 lb. straw.

No. IV.—Sheriff's Bearded White.

O A. 3 R. 3 P.

	Bushels.	Stones.	Lb.
Good Wheat......	31	1	0
Grey Do.	0	3	2

Weight per bushel 65 lb.—143 stones 13 lb. straw.

No. V.—Mixed Lammas and Nursery.

O A. 3 R. 4 P.

Produce per Imperial Acre.

	Bushels.	Stones.	Lb.
Good Wheat......	32	1	9
Grey Do.	0	6	6

Weight per bushel, 65 lb. = 156 stones 5 lb. straw.

These experiments shew the great variations both in the quantity of grain and weight of straw per acre of different seasons. The soil where the experiments were made in 1869 was more gravelly, and suffered more from drought. The crops had to contend against a second dry season. There was also less sunshine and the grain was not so fine in quality. East Lothian suffers like other counties from the wheat fly. We observe a little of it more or less every season. A continuation of wet or dull days immediately after the ear has cleared the shot blade, is the cause of this. It requires dry weather and bright sunshine to enable the flower to come freely out. It sometimes happens all the earliest varieties escape the ravages of the fly and the later ones suffer. Often this is reversed. In all agricultural matters in which such diversity of opinions exist, people should never set their heads determinedly in favour of their own. If farmers be not wilfully blinded, and due confession is made, most farmers will admit their opinions on many important subjects are changing every year. There is no branch of national industry in which greater changes are taking place at this moment than in agriculture. It is only by long practice, combined with most careful observation, that anything approaching true knowledge may be found.

NO. XVI.—THE TURNIP CROP.

The fourth crop of the rotation in East Lothian is most generally turnips after wheat. The stubble is easily cleaned, and the summer cultivation of the crop thoroughly prepares the land for being sown out with grass seeds along with the grain crop next spring. It is not the invariable rule in East Lothian to sow young grass after the turnip crop. Some farmers prefer sowing the young grass with a wheat crop after potatoes. The young clover plants seem to thrive well after potatoes, and the wheat crop is not so liable to be laid as the barley crop after turnips. Generally the young grass is better planted when sown out with wheat. However, we prefer sowing out after the turnip crop. The land is thoroughly clean, and it is more in accordance with our ideas of correct husbandry to place the turnip crop fourth in the rotation.

East Lothian is not famed for growing large crops of turnips. The climate is too dry. Our farmers do not complain of this, because what is lost by dry weather in the turnip crop is more than compensated for by its advantages for the potato and grain crops. The annual acreage of turnips grown in East Lothian is about 16,000. In a dry climate like ours, it requires good management of the land in spring to keep in the moisture. The fields intended for turnips are generally all ploughed before January, and they are never touched till the potato planting is finished. It used to be a common practice to plough all the turnip land over at least once, sometimes twice in spring, a most absurd custom, for besides the enormous amount of extra labour, it worked out the moisture and rendered the soil much harder and more difficult to work into a fine surface, than when simply drilled in the winter furrow.

Turnips in East Lothian are all sown on drills 27 inches wide, made exactly the same way as for potatoes. The manure being sown as the drills are drawn off, and then covered in and the turnip seed sown on the top, from a machine which sows two drills at a time. Our practice in preparing land for turnips is to harrow it, and then grub it as deep as possible, sometimes three times, always twice. Care should be taken to grub it the last time in the opposite direction the drills are intended to be drawn. After being grubbed, it should then be well harrowed and rolled, and left lying for a fortnight or three weeks before the turnips are sown. It may not be safe on all soils to do this, because it sometimes happens we have heavy rains in May, which might cause all the work to be repeated. Very little farm-yard manure is applied to the turnip crop, as it is nearly all used for potatoes. The turnip crop does not suffer from this to the extent one might suppose, because it has been satisfactorily proved that a proper mixture of artificials, applied in sufficient quantity, can grow as good turnips as a combination of dung and artificials. In a dry climate like ours, farm-yard manure when applied in the drill, unless it is thoroughly well manufactured, does more harm than good. But if well made, it retains its moisture, and we have seen effects even in very dry season.

EXPERIMENTAL MANURES ON TURNIPS.

About thirteen years ago, when the increasing acreage under potatoes was swalig up nearly the whole of the farm-yard ire, the Haddington Agricultural Club ired a series of experiments to try the bility of growing good turnips *without* farm-yard manure at all. In order to up the experimenters for their trouble, Messrs Cunningham of Edinburgh, Maclean & Hope of Leith, manure hants, offered each £25 for the reports. The trials were made over seasons, and were of much value in ing what could be done with artificials . The experiments were made with ish turnips, being the most valuable and ring most manure. We had a plentiful y of first-class Chincha Island guano in days, at about £12, 5s. per ton. e experiments were also conducted the view of finding out a substitute for best Peruvian guano, which we knew not last for ever.

2 tons farm-yard manure; 4 cwt. Peruvian guano.
cwt. Peruvian guano; 2 cwt. dissolved bones.
cwt. Peruvian guano; 2 cwt. bonemeal.
cwt. Peruvian guano; 2 cwt. Bolivian guano.
cwt. Peruvian guano.
cwt. Peruvian guano.
itrate of soda and phosphates, same manurial strength as 6 cwt. Peruvian guano.
ulphate of ammonia and phosphates, same manurial strength as above.
cwt. Peruvian guano; 5 cwt. Bolivian guano.
cwt. Peruvian guano; 5 cwt. bonemeal or dust.
cwt. Peruvian guano; 5 cwt. dissolved bones.
cwt. Peruvian guano; 5 cwt. bone ash superphosphates.
½ cwt. nitrate of soda; 2 cwt. of dissolved bones; 2 cwt. rape dust; 2 cwt. Bolivian guano.
g.

took 12 tons of thoroughly well made ard manure, and 4 cwt. Peruvian , to test the other experiments. The ments were made on a large scale, ¼ acre each. The table gives the ties of manures per imperial acre. In g experiments with Peruvian guano we had previously ascertained that it ot profitable to apply more than 8 cwt. e for turnips. In some instances the as increased if applied at the rate of 12 cwt. per acre, but not in proportion to leave any profit for the extra expense. The turnips grew too much neck and tops. These experiments were conducted on every kind of soil and climate in the country, and we were thoroughly convinced that swedes can be grown without dung. On the farms where the dung and guano gave the largest crops, the superiority was not above 1½ tons per acre, and in some farms the artificials gave the best crop. Another feature of these experiments was the decided superiority of all the experiments, in which the phosphatic element predominated over the ammoniacal. We were not successful in the attempt to manufacture a manure like Peruvian, either from a mixture of nitrate of soda, or sulphate of ammonia with Bolivian. Adding pure ammonia to any of these phosphatic guanos seems to change the character of the soluable phosphates. The crops grown from these mixtures of manures varied from 16 to 28 tons per acre during the seasons they were tried, but the results of any single year were very much alike, the variation not being more than 2 tons per acre between the best and the worst of the series.

VARIETIES OF TURNIPS.

The East Lothian swede is considered the best variety. Its shape is slightly oval, and grows with a small neck. We have seen many variations both of shape and colour in this swede, simply because there is no root so liable to deteriorate as the swedish turnip, unless great care is taken in its cultivation. Nine-tenths of the seed which is sold is raised thus: It is sown about the middle or end of July. It is seldom singled, and the seed is grown from partially developed bulbs. Any one conversant with agriculture knows how liable all kinds of roots are to deteriorate unless every care be taken in their propagation. We do not wish to interfere in any way with the legitimate business of the seedsman; but in regard to turnip seed especially, we would recommend farmers to grow their own, from transplanted bulbs carefully selected. A very small corner of a field, or some disused cottage garden would be sufficient. The variety we have described would improve under this system of being grown from well-shaped transplanted bulbs. Seed merchants could not afford the expense this would entail for the bulk of their stock, unless the price per lb. was raised very much, which purchasers would grudge to pay. The acreage under swedes has increased very much of late Besides being more valuable for feeding, they are very hardy, and can stand a great deal of frost. Last winter, 1870-1871, in spring we saw them quite sound and fresh in fields after six weeks' frost, when all the other varieties of hybrid turnips were rotted into pulp.

In proportioning the varieties of turnips to be sown on a farm of average quality of soil, we would recommend White Globe and Fosterton Hybrid for the months of October, November, on to the middle of December, and swedish turnips till the end of the season; they keep quite fresh till nearly the end of May. On most farms in the county, about a-half of the turnip crop is eaten on the ground with sheep, and the other is driven home and stored in large pits, to be eaten in the cattle courts. We must consume a large quantity of turnips in the feeding courts in order to rot down the straw for manure. There is no system so well adapted both for cleaning land thoroughly and putting it in good condition, as eating on turnips with sheep, especially if they are allowed oilcake besides. Instead of feeding sheep of their own, some farmers let their turnips to graziers or dealers. The kind of regulation price for aged sheep is 6d. per week. When turnips are let for cattle it is generally by the acre; £8, 10s. is considered a fair price for an average of years. When taken for cattle by the week, from 4s. to 5s. per week is generally paid for aged cattle. If the taker of the turnips wishes to give his stock, " either cattle or sheep," oilcake, £3 per ton is the usual allowance for the best cake. If the farmer is anxious to attend to his own interest, every encouragement should be given to the feeder of the stock to use as much cake as possible.

In storing turnips, great care should be taken to avoid carting them during frost. A very slight frost causes the bulbs to decay in the pits, unless the frost has been thoroughly out of the roots before being stored. Those intended to be kept till the very end of the season should be planted close together on the ground. In an open season like this, the tops are apt to shoot, but they can be cut over. The roots keep much fresher than in a pit.

We have mentioned the prices at which turnips are let per acre in East Lothian, of course the taker of the turnips is entitled to some profit both for trouble and outlay of money. The value of turnips in East Lothian may be calculated thus, for example:—on Lord Tweeddale's home farms, his calculation is to feed 1 bullock or 7 sheep on every acre of turnips from October till the end of April or beginning of May. It is quite possible to feed both more cattle and sheep, by giving them potatoes and oilcake and hay, in addition to turnips; besides, very lean stock require much longer keep than animals advanced in condition. We are thus minute, because a considerable difference of opinion exists on the subject, and farmers, as a rule, do not sufficiently calculate what really is the proper amount of stock to consume their crop of turnips. We have often seen stock forced away from want of sufficient keep. It is best to err on the other side. The turnip crop of 1871 is certainly an exception. Our farmers have more turnips than they can procure stock to eat—this seldom occurs in East Lothian. We did not mention the quantity, seed sown per acre—" 3 lb. is a fair allowance, but all depends on the nature of the seed." 2 lb. of home-grown fresh seed is quite enough. We are anxious in East Lothian to see how far it is possible to grow turnips in rows on the flat. In a dry country like ours it might be an improvement on our drill system.

NO. XVII.—THE BARLEY CROP.

Barley has now become a very important cereal crop in East Lothian, as the very large acreage now grown fully proves. The extent of land under barley is annually about 14,000 acres. (Last year the precise number, according to the recently issued Agricultural Returns, was 14,831). It is mostly all grown after turnips—a small proportion after early potatoes. About thirty-five years ago, there was comparatively little barley sown, spring wheat being considered a more valuable crop. The reason of the change in this respect may be attributed to various causes, of which the chief is the high price of the grain. For the last fourteen or fifteen years, barley has sold steadily at a much higher price than wheat. Under Free Trade, we can compete successfully with foreign countries in the cultivation of barley, because the quality of our grain is generally better than theirs, but we cannot say the same in regard to our wheat.

To illustrate the change in the value of the grain, it was a common practice, in adjusting grain rents in East Lothian, to take 1 qr. of barley and 1 qr. of oats as the equivalent of 1 qr. of wheat. About twenty years ago, reference to our fiars prices will shew the value of the quarter of barley and oats to have been, together, less than the quarter of wheat. What a change has taken place of late, and with every probability of its continuance when barley has been selling almost at the same price as wheat! Three years ago it was worth a trifle more. So much for the increasing demand for malt. With reference to the preparation of the land for barley, in order to grow a good crop, it is necessary to eat on the ground a considerable proportion of the turnip crop. The quantity will depend on the condition of the land. It entails a good deal of waste to eat on the whole crop of turnips. The usual practice is to remove four drills and leave four drills. This allows half to be eaten on the land. An allowance of 1 lb. of oil-cake per day for each sheep will ensure a first-rate crop of barley. On some farms, where the land is not suitable for eating on turnips, artificial manure is applied to the barley, but the crop is never so good as where the turnips have been eaten on the ground. Barley is naturally soft in the straw, and, when top-dressed, it is very apt to be laid before the pickle is properly filled, and the quality is never so good, and the yield deficient. Eight qr. per acre is considered a very good crop, but this yield is by no means unusual on land farmed in the way we have mentioned.

The crop of 1871 is the worst we have had for years. We hardly think the average of the county will reach 5 qr. per acre. This is owing very much to the unusually cold summer of last year. The crop was not so deficient in straw, still the yield has been far short of our expectations. There have been some very good samples exposed in our markets, weighing from 56 to 59 lb. per bushel, of fine colour and excellent malting qualities, but these were exceptional. We had bad weather during harvest, a great deal of barley was stacked in bad condition, especially in the later districts.

A great deal of loss was also sustained from a tremendous gale of wind before half the crop was cut. It is a true proverb, "the early bird catches the worm," and there is nothing like having the crops early sown. We may have less bulk, but it ensures both quality of grain and the chances of a safer harvest.

We begin to sow barley about the first or second week of March, until the end of April. When the sowing of barley may be completed in this year of grace 1872, is a problem which only the weather-god can solve. At the time we write, April 1, there has only been a small proportion sown. The land is at this moment completely saturated, and nearly the whole of it unploughed, with every appearance of another wet week. The earlier varieties of barley will be much sought after, unless a favourable change of weather immediately occurs. The favourite variety of barley in East Lothian is chevalier. It is more productive than any other kind, and is also most preferred by maltsters.

We may here mention that less attention has been paid to the propagation of pure varieties of barley than either of the other cereals. A few years ago, a very eminent grain merchant, when asked by a farmer to places during winter, to induce them to shoot, and in the months of March and April they are planted, generally in large beds, well-manured, and covered lightly with soil by the spade, and with litter on the surface. They are thus covered and uncovered daily until safe from frosts; and so watchful are the growers—who are a distinct and peculiar class—that if during this time a dangerous frost threatens, they are said to take the blankets off their children to put them on the potatoes. In May they begin to dig, and sell at 2s. 6d. per lb., and finish at about 3d., thus realizing from £50 to £100 per acre; and from having resided several years in the county, and seen the care and labour bestowed upon the crop, I must say the cultivators deserve the reward they obtain. Another proof of the predominating importance of natural soils as the basis of successful results over artificial condition, is the case of Mr W. Thomson's great Tweedside vineyard, near Galashiels, in Selkirkshire. When in charge of the Dalkeith Palace Gardens, Mr Thomson was frequently called upon to act as judge at horticultural shows; and finding one grape-grower always coming to the front, and taking the first prizes, he was induced to visit the locality and inspect the soils from whence they came; and finding some land of precisely similar character in the immediate neighbourhood, he purchased it, and established the above-named vineyard. It occupies nearly 4 acres, and is covered with 50,000 feet of glass, has miles of hot-water piping, and other necessary appliances, and is calculated to produce tons of grapes, hundreds of pine-apples, and thousands of pot-vines annually. When selected, this land was devoted to common farming purposes; but it has already produced grapes which have competed successfully in London and Paris, thus shewing that the soil itself contains some inherent qualities which no art can rival.

THE GEOLOGY OF GARDENING.

Apropos to grape-growing, I have seen many evidences that a water-bearing substratum within reach of the vine roots is a source of constant fertility, providing the water belongs to a running stream and is not stagnant. The productiveness of the great Black Hamburg at Hampton Court is no doubt due to the Thames. On the banks of the Stour, in Kent, I have seen the same results, and perhaps Mr Thomson's success may also in some measure be due to his proximity to the Tweed. The geology of gardening is thus shewn to be worthy of study especially in the formation of new grounds. In a few cases indigenous plants may be some indication as to what species to grow, but experience is the only sure guide. From experience we learn that fruit may be grown on some soils if grafted on to an indigenous tree, quite different to what it would have grown on its own stem, and the produce of trees on some soils is quite different to what is on others. In the cider countries, quite different cider is made from apples of the same kind grown on different parts of the same farm, shewing the predominating influence of soil. Even the market-garden grounds around London, although apparently so similar, have all their specialities. Fulham and Isleworth are famed for the finest fruit—asparagus and rhubarb, interspersed with countless moss-roses and flowering plants. Bermondsey and Deptford are noted for seakale and celery; Barking for rhubarb, early cabbages, onions, and potatoes; and all other districts throughout the country have some specific natural properties which no art can impart. Nature, too, has favoured some districts with climate, to rival which by artificial means is a very uphill and profitless undertaking. Witness the early products of Cornwall and the Channel Islands in the London markets; and the success of the consignments to Glasgow I have already mentioned, and which was no doubt owing to their forestalling the northern growers, perhaps only by a few days, but still shewing the advantage of earliness in vegetable production and the levelling influence of railways.

MARKET GARDENING AROUND LONDON.

Around London there are about 12,000 acres devoted to market gardening, and 6000 to orchards, intermixed with vegetables and flowers; for although it is not the practice in the cider and perry districts to cultivate the orchard ground, it is in those around London. About 40,000 hands are irregularly employed upon these grounds. On the chalk formations around Mitcham, Carshalton, and Epsom there are about 500 acres devoted to the production of herbs, of which lavender is the principal. These crops bring in from £20 to £30 an acre annually, although the land on which they grow is not worth more than 30s. an acre for any other purposes. The returns from the suburban market gardens are sometimes very large and remunerative, arising more from the enormous crop the land is made to produce than from high prices. In a very productive year prices are usually low, and when there is only a partial crop, foreign supplies of fruit and vegetables—all of which come in duty free—keep down the prices. The only protection that native growers now have is to produce abundantly, and keep down the cost of production. Most of their grounds are managed with such consummate skill and industry, that to offer a suggestion would appear almost like presumption, but I will venture to offer one or two. From excess of ammoniacal manure a good many of their crops both bulbous and brassica, run more to top and leaf than to root and head, than is profitable. The brassica tribe are also subject to clubbing, and the surface of the ground to be infested with chickweed. Now the whole of these drawbacks can be remedied by the application of mineral manures, bone-dust, and superphosphate of lime, and that inexpensive article gypsum. Last year I tried what the effect would be of London dung applied at the rate of 100 tons an acre on deeply trenched land, on which I planted Bovinia potatoes 6 feet apart each way; long and Globe mangold, swedish, yellow and white turnips, white and red carrots, parsnips, cabbages and maize, at protionately wide distances, and the result was a total failure in every case except the maize, which reached 8 feet in height, and was well podded. On another piece of garden ground, trenched 2 spits deep, and manured from the farm-yard, and dusted at the rate of 5 cwt. per acre with dissolved bones, I dug Bovinia potatoes at the rate of 2 cwt. per perch, or 16 tons per acre, and some of the tubers weighed 3 lb. 14 oz. each, and many of them 2½ lb. and 3 lb. I would also suggest, to economize the valuable orchard grounds around London, which are being gradually curtailed by buildings and railways, that the French espalier system of training fruit trees should be adopted, and likewise dwarf or bush fruit trees planted. The latter in windy places are invaluable, and the fruit can be gathered with little labour or expense.

THE PRACTICE OF MARKET GARDENING.

In forming new orchards and gardens it is not only necessary to select the best species, but to propagate from the most vigorous and productive parent plants. This is as beneficial in the vegetable as in the animal world, for like produces like, and establishes what may be called pedigree plants. If new sorts are required, they must be obtained from the seed, as in the case of potatoes, and occasionally a hit may be made, as was done in potatoes by the late Mr Paterson, of Dundee, when he originated the Victoria and Bovinia. But when we know that this was the main success of forty years' perseverance and some hundreds of experiments, there does not appear much inducement to practical men to be the originators of species. In the case of vines, I have known instances where slips from fruitful parents produced twice the weight of grapes that were obtained from others of the same species growing side by side, and under the same treatment. The celebrated Fenton wheat, which has long been one of the mainstays of Lothian farming, was originated and propagated in this way by the tenant of the farm that gave it its name, and whose position at the present moment in connexion with said farm is so sympathetically before the general public. This movability of tenant-occupiers is so entirely incompatible with the high manurial condition required in market gardens and the establishment of orchards, that many of the great growers around London are their own landlords. And here I would remark how much the unsettled and hand-to-mouth positions of agricultural labourers of the present day militates against the best cultivation of their cottage gardens and allotment grounds, and the propagation of fruit trees. In Cheshire, where the labourers are almost permanently established in their cottages, it is not an uncommon thing for them to pay their rents and something more by the sale of the surplus fruit-crops, for they use a great deal themselves. And here I would observe that the damsons grown in this county, principally in the farmers' and cottagers' gardens, are like their famed cheese, which cannot be produced elsewhere "unless," as was quaintly said by an old county historian, "you take not only the kine and the dairy-women, but the land also;" for in size and flavour they are not approached even by the best products of Kent. In my own district, on the Bagshot sands, we can grow very good strawberries, but we are obliged to cart the strawberry loams from other districts to do so; and our white sands and black peaty soils are constantly carted away to grow deciduous plants elsewhere. The only transposition of soils that will pay practically is when found on the spot, and either in the formation or renewal of orchard and market-garden ground may be profitably resorted to; thus in double-spit work a good rich marl, clay, or gravel may be brought to the top; or if not good enough for this, it may be simply turned over. In three-spit work it may be dealt with in three ways—brought to the top, placed in the middle, or simply turned over. Trenching and deep draining, if necessary, of one kind or another, is the basis in the formation of all orchards and market gardens. The next important step is the proper stocking with trees suitable to the soil and for the purposes required, whether for conversion into cider and perry or for dessert; and in the case of market gardens, the adoption of a rotation by which a succession of crops can be obtained without plants of the same tribe following one another.

THE COST OF FORMING ORCHARDS, ETC.

The original cost of forming orchards and market-grounds is very various, but in amount it is pretty much alike, because in the cider districts where grass is allowed to grow amongst the trees, it is regularly manured and mowed, and in the surburban districts the land is highly cultivated. The minimum cost of formation and stocking I have found to be about £30, and the maximum £50 per acre, and in exceptional cases I have known it twice as high. The rents vary from £5 to £20 per acre. The latter sum appears high, but an occupier in Bermondsey who paid £16 an acre and all rates and taxes, to whom some years ago I let a farm 8 miles from Covent Garden at a-third of that rent, lamented that this was being curtailed by buildings, as he said it was the most profitable land he occupied. The returns from land of this kind, and from orchards round the metropolis or at greater distances, are so fluctuating that it is no guide to quote them. I have known the produce realize £150 an acre, and in other seasons barely the cost of production, which, including rent and interest of capital, seldom runs short of £30 an acre on well-managed ground.

THE MANAGEMENT OF THE PRODUCE : SEWAGE.

One great drawback to growers is the smallness of wholesale prices in proportion to those at which their goods are retailed. Last year I question if they averaged one-fourth, and yet consumers complain and say the cost of vegetables is a grievance in every household. Many small growers protect themselves by "standing the market" themselves, and the larger farmers have special agents, old, proved, and trusted foremen, or some one interested in their profits; but there is still a very large class who are obliged to trust to salesmen, who charge their 10 per cent. in the fruit and vegetable, and 5s. per ton in the potato markets, and be content to take what residue they can get. A novice in the trade or an amateur has no chance in the London markets however successfully they may grow the articles required; and it is [illegible] question whether consumers have not [illegible] lequate inducement to establish co-operative ores in their respective districts. The llowing articles, which were sent from one oderate-sized garden in Fulham to the Lon-on market in one year, will shew the amount id variety of articles it takes to make up a arket gardener's returns:—

Forced Radishes	5,000 punnets.
Natural ditto...............	288,000 bunnches.
Greens........................	360,000 ditto.
Cabbages	312,000 heads.
Wallflower	4,800 bunches.
Moss Roses	9,600 ditto.
Hand-glass Cauliflowers	4,800 heads.
Asparagus..................	600 bundles in a day.
Lettuces......................	200,000 in one month.

'hen these grounds change hands, which iey seldom do, except those on the smaller :ale, valuers are employed by the outgoing id incoming tenants, who are specially acuainted with the business, and are generally iarket gardeners themselves, and in some ises the payment from the one to the other as been as high as £100 an acre. I have ot thought it necessary to enumerate the roducts which are naturally in season at ifferent periods of the season, because there re so many artificial appliances in use, and upplies come from so many distant places, hat our markets are seldom devoid of anyhing thoughout the year. Horse and cart distance at one time embraced the area from which we drew our supplies, and this has still some advantage in connexion with the supply of manure. But if sewage is carried into more distant districts less highly rented and burdened with expensive labour, this advantage will be lessened. Sanitary precautions will not allow occupiers within proximity of towns and populous districts to avail themselves of it, but last year I valued the owner into a farm of 160 acres, 8 miles from the Bank, which he has sewaged and let at £10 per acre to two native tenants—the former rent having been 52s. 6d.; but as the experiment is not yet well begun, I cannot quote or even predict results. Steam-ploughing may also come into play, which it has not as yet done, as a large stud of horses must be kept in proportion to the acreage, for alternate cartage and working on the land. I have not gone into the management of orchards in the cider and perry countries, nor into the numerous and productive fruit gardens of Kent, because they have already been fully described in the county and in local reports, and except that there are innumerable inferior kinds of trees and plants occupying space entitled to better sorts, I cannot suggest any improvement in their management.

PHOSPHATES AS FOOD FOR PLANTS.

THE last meeting for the present session of the Dorchester Farmers' Club was held last week—Mr R. Genge occupying the chair—when Mr W. C. Spooner, of Elwig House, Southampton, made the following remarks on the important subject of "The Phosphates as Food for Plants:"—

Every farmer must acknowledge that for the average of seasons, agriculturists were very much indebted to phosphates. But he supposed that owing to the great luxuriance of the crops, the mildness of the season, and the superabundance of feed, cultivators were rather disgusted, and were beginning to think that their requirements would have been met if they had not had these phosphates. Although by no means agreeing with the doctrine that it was necessary all farmers should be chemists, yet he could not help thinking that any small amount of knowledge gained from a single lecture on some subject bordering on chemistry, or rather allied to both chemistry and agriculture, must be of some value, if even it only set minds thinking and turning over the subject during leisure time at home.

THE INTRODUCTION OF ARTIFICIAL MANURES.

It was in the early part of the present century that bones were introduced into the north of England; then it was extended to the south, he believed, about the year 1820. Some years afterwards a great revolution took place, for about the same time that Peruvian guano was introduced and many other guanos were brought over, the use of superphosphate was discovered. Peruvian guano, although for a great many years previous to its introduction into this country it had been applied in the neighbourhood where it was discovered, Peru, yet it did not at first become a matter of commerce, for but a small quantity was brought over, which was sold at £20 per ton. Mr Spooner mentioned several varieties that were introduced, and observed that during the period in question, the use of manufactured superphosphate of lime was not adopted to a great extent. Guanos were much used, and were of very great utility, one reason being that the phosphates were in a much more soluble state than when found in bones and other materials. After they had been pretty well used up, the discovery of phosphates took place in various parts of the world. Previous to this, coprolites were discovered in several places—amongst them, Suffolk and Cambridgeshire. These coprolites were found in large quantities. A specimen which he exhibited, contained, he said, 50 per cent. of phosphate of lime, while in the Cambridgeshire coprolite, it was 60 per cent. They were used to a very large extent with bones; but soon afterwards other more valuable phosphates were discovered. German phosphate—from Germany—containing from 65 to 70 per cent. of phosphate of lime was introduced. Then there were very rich Spanish phosphates containing from 70 to 80 per cent. Such phosphates were found in Estremadura; these were taken to Lisbon and then shipped. Still more valuable specimens came from Sombrero, an island of the West Indies. It would thus be seen that there was a considerable difference in the value of phosphates. That very interesting substance now in question, found by the Americans, was used in considerable quantities; it was first ground up in New York in order to renovate the exhausted soils of the southern States. When the British flag was hoisted and the island was shewn to be one of our possessions, some thousands of tons were brought over; he himself had used a considerable quantity, because it had the great advantage of being free from silica, and the phosphate was of an extremely valuable kind. There were other sources from which phosphates came; in Norway there was a good specimen, but its importation into this country had ceased to be profitable. There was guano

avassa, in the West Indies, which was
to the German phosphate, and con-
from 65 to 70 per cent. of phosphate
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hates could be obtained was very
ate, because it was impossible that
could supply—he was going to say
nth—at any rate one-quarter the
d for phosphate. A considerable
ty of burnt bone had been imported
outh America; this was very valuable.

MPORTANCE OF PHOSPHATE ELEMENTS IN PLANTS.

bones were used as fuel and the fat ex-
l from the carcases. The importance of
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and largely contributed to their utility
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ly in the form of artificial manures.
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but in very small quantities, and in a
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oluble state. In the few instances where
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in manures has no sensible effect.
hewed how wrong it is to state that in-
phosphate is of no value. The presence
ute quantities of phosphate of lime in
oils is in striking contrast to the pre-
of potash, which is found wherever alu-
s present, and exists to a much larger
in most soils than does phosphate of
In some soils there is no less than
4 to 6 tons to the acre, reckoned
the depth of 5 inches. This readily
s the fact that the direct application
sh is by no means attended with the
success as that of phosphate of lime,
gh in the ashes of most plants potash
nd existing to a much larger extent,
consequently taken up in the produce in a much larger degree. In the crust of the earth, which forms the cultivated soil, potash is found to a very large extent, whilst phosphate of lime exists much more sparingly. On the other hand, in the various sources of supply furnished by rocks or natural salts, potash is only present to a very moderate degree, thus kainit or potash salts, almost the only natural supply, only exists to the amount of about 13 or 14 per cent., whilst phosphate of lime is found in various rocks and fossils in such abundance as from 50 to 80 per cent. Mr Spooner exhibited examples of phosphates containing large per-centages, and which, he observed, are consequently available for manufacturing purposes; if it were only found to the same extent that potash is found in kainit, it would be useless for the purposes of manufacturing.

PHOSPHATES IN THE SOIL.

In the crust of the earth altogether, potash is far more abundant than phosphate of lime, for besides its presence in such prevalent rocks as granite and felspar, it exists in soils to a far greater extent. Thus on looking over some analyses of soils he found, calculating a depth of 5 inches, which would give about 500 tons to the acre, potash to the amount of 4 and 6 tons, whilst in phosphoric acid, on the same soil, he only found at the rate of ⅓ or ¼ of a ton. Then it should be borne in mind that although some potash is carried away in the carcases of animals, by far the larger portion is returned in the dung, whilst with phosphate of lime a considerable portion is carried away in the bones of animals. In a rotation of four crops, the potash taken away is restored by the 20 tons of dung that is usually given during this period, for dung contains as much potash as phosphate of lime, so that 20 tons contains nearly 3 cwt. of either constituent. Bone earth was a tribasic phosphate composed of lime and phosphoric acid; but the latter was not a simple body, seeing that it was composed of phosphorus, an inflammable metal, and the gas oxygen, which formed the vital part of air, and which abounded throughout Nature. Agricultural chemists had been puzzled very much, particularly in the early days of the science. For instance, they found in the ashes of turnips a much greater quantity of potash than of phosphorus, and they jumped to the conclusion that the former was the essential manure until practice proved the contrary. Now, the ordinary state in which the phosphates are found in soils and rocks is that of a tribasic—that is, that one part of phosphoric acid is united to three parts or equivalents of lime, and in this state it is fortunately insoluble, otherwise a portion would be washed away by every rain. Before, therefore, it can become food for plants, it is necessary that this insolubility should be reduced, and this is done by means of the carbonic and other vegetable acids that are to be found in the soil. In the preparation of superphosphate of lime, a very strong acid is used, such as sulphuric, which is the strongest acid known; and the effect of this is that after a certain portion has acted on the carbonate of lime, uniting with the latter and setting free the former, which is the cause of the strong ebullition or boiling up we observe, the remainder of the acid decomposes the phosphate of lime—that is, unites with two parts of lime out of three, leaving the one part combined with the whole of the phosphoric acid. We have as the result sulphate of lime or gypsum from the union of the sulphuric acid and the lime, which is only of moderate value, and is comparatively insoluble, and to which the value of the manure is principally due. There is, however, some portion of the phosphate of lime not dissolved, because if sufficient acid were used to dissolve the whole of the phosphate, the manure would be too wet, and would require the addition of drying materials, which would add to the weight without adding to the value.

THE MANUFACTURE OF SUPERPHOSPHATES.

Well, when superphosphate was first applied to the soil it was naturally thought that its benefit was due to its solubility. It was found, however, that the soils which benefited most by its use were those which most quickly rendered the superphosphate comparatively insoluble, such as those in which carbonate of lime abounded, and which quickly united with the acid. The good effect of superphosphate was due chiefly to the infinite divisibility of the phosphate of lime, which even when precipitated in the soil became reduced and divided to an infinitely greater extent than any mechanical means could accomplish, besides which the solubility of the phosphate in the first instance caused the rain to distribute it through the soil, where it met the carbonate of lime, by which it again became reduced. Mr Spooner illustrated his remarks with several interesting experiments. He mentioned that his own connexion with guanos and superphosphates—which had greatly increased the resources of agriculture—was of some considerable duration. In the year 1844 he was making some experiments—with regard to superphosphates—on a little farm which he held, and he paid considerable attention to the subject. The same year the Royal Agricultural Society offered a prize for the best essay on the use of acid and bones—for the term superphosphate was not adopted at that period. He contended for the prize, and was fortunate enough to win it. He received letters on the subject from many persons in different parts of the country. The first mode of manufacture was of a very rough description. Great improvement in the manufacture had since taken place. In conclusion, he adverted to the subject of analysing manures, especially the analysis which had recently taken place under the auspices of the club. With regard to the values attached to the manures by the analytical chemists, he thought that if less importance were attached to that the better it would be. He submitted that the chemists had first to ascertain the cost from the manufacturers, and knew nothing themselves about the prices; therefore the figures which they give were unreliable, and calculated to mislead. He suggested that members of Farmers' Clubs should be able to understand and estimate an analysis for themselves.

THE DIFFERENCE OF SOIL AND ITS TREATMENT.

By Mr GEORGE GROVE.*

I SHALL confine my remarks to the neighbourhood of Christchurch, in Hampshire, and to their mode of cultivation wenty-five years ago (that being the time I ived there). It is, I have no doubt, very much improved since that time. It is a large parish, about 11 miles long by 9 wide, and t has a variety of soils, from the land that will blow in summer like drifted snow to the very deep strong land that requires from three to four horses to plough it. I will first speak of the light sandy soil. The best thing to consolidate it is 10 or 12 tons of chalk per acre. If you put 20 tons per acre you would injure the land for several years. There is more than one advantage derived from the application of chalk; you not only consolidate your land, but you prevent club-rooting in the turnips grown on it after chalking, and destroy a great many annual seeds, as Botham and Shepherd's Pouch, to which this land is very subject. It never requires more than two horses to plough it, and in cleaning the fallows we used the double turn-furrow plough with three horses in it, with which we average 3 acres per day, or 1½ for each turn-furrow.

PREPARING THE LAND FOR SOWING.

There being scarcely any thistles or knapweeds, much larger furrows are taken than on land which is subject to these weeds. This description of land is generally managed on the four-course system—wheat, turnips, barley, hay. Sometimes the hay-stubble is broken up and put into turnips, and as the land is so kind for roots, I have seen splendid crops without superphosphate or any other manure. It is then put into spring wheat or some Lent corn crop as a change. In ploughing hay-stubble, I have found it wear out more points than any land on which I have had any experience, which is owing to its gritty nature. It wears out as much as one point per day. In breaking up the ley for wheat we never thought of raftering, as it made the land too porous and light. Raftering I believe to be injurious, even in cleaning a foul piece of land (in such land) as the short pieces of couch will be so mixed with the soil that no amount of fine weather will kill it. In the cultivation of barley, when the land has worked so unkindly as it does this year, I have many times nine-shared it over again after the barley has sprouted. I have drilled the corn and finished it off; but finding the land too light after the grain has sprouted, have torn it up with the nine-share, and dressed it down again with the best result. When my father left Avon, in 1827, the incoming tenant ploughed the land much deeper than we did, and my father thought that he had

Better be asleep
Than plough so deep.

But I have lived long enough to see that what poor Richard wrote is correct:—

Plough deep while sluggards sleep,
And you shall have corn to sell and to keep.

At the present time, Mr Whicher, of Avon, ploughs his land 7 inches deep for wheat, the manure being pulled out several weeks before to grow into the land. The sheepfold does a great deal of harm during the summer months, as this land grows nothing but weeds after.

HOEING LIGHT LAND.

To return to the cleaning of the land: we found the Finlayson's harrow a very good implement. It would not do to dress it too much when it was so very loose, as the couch would work in instead of out of the land. We never wanted anything to consolidate the wheat land, as the rain in winter would get it firm enough. There being a sort of crust formed over the soil in the spring, hoeing worked wonders, but it was then an expensive operation. There is now a great improvement in horse hoes however; an old neighbour of mine told me that instead of paying 4s. or 5s. per acre, as he used to do, he could now do 15 acres per day with two old hack horses. This, we must all admit, can be done at a very trifling expense. Where the land is hilly it stands at a great disadvantage for hoeing, as the lower part will go so deep and the upper barely touch. I recollect when bones were first used in the neighbourhood. We had no drill, but sowed them out of a seed-lip, sowing them on every other ridge. The result was very marked.

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* Read before the Winfrith Farmers' Club.

PREPARING AND CROPPING HEAVY LAND.

Now for the strong land. The best mineral I ever found for that was marl. It is a sort of clay dug in the New Forest from the very poorest soil I know. We used to put it on the land in the autumn so that the frost might slack it. When it is thus pulverized it can be much more evenly distributed, and its action is much more beneficial. We put on from 20 to 25 tons per acre. The crops told of its application for more than twenty years. The cropping on the strong land was much the same as on the light land, only a summer fallow instead of turnips. I think that a good deep fallow ploughed at least four times in the summer will, on the average of seasons, grow a better piece of wheat than after turnips, rape, or anything else. I used to think it assisted the tillage of the fallow land very much if the wheat, instead of being hewn or mown was reaped very high, as it would make it work so very mellow. With the reaping machine you can leave the stubble 6 inches high, but I have found if you go very much higher, the sheaf will not be thrown out so evenly.

TILLAGE IN DORSET.

There is one thing indispensable to good tillage, and that is to have the best and most improved implements. No farmer should be without that effective implement for pulverizing—the grubber. There are so many other implements that it is difficult to tell which is the best; but in my opinion, if you wish to move the land effectually there is nothing like the plough. I think, if you wish to save yourself a deal of trouble and labour in cleaning your fallows for turnips, you must not be in too great a hurry to dress it after it is ploughed, nor to plough it too quickly after it is couched, as it is the small pieces which the couch-rake will not take. Being ploughed in again they grow and undo much which has been done. After the chain-harrow, the common harrow should be used, so that the sun may dry up the couch before it is ploughed in again. I have never used the steam plough, but from what I have seen of it the soil ought to be dressed out directly after, or it will grow again, unless it is very dry weather. Autumn cultivation is all very well in fine weather, but almost useless in wet. As regards breaking of stubbles, if your land is ever so clean, I should advise a rafter, as it makes the land so much more mellow the following summer, consequently better for any roots you may think proper to put in. The Scotch system is in favour with some in this county; but I am of opinion that from six o'clock till two, horses if they are properly kept at work, will do a very good day's work, and if you keep them more than eight hours at work it is the horse-dealer who reaps the benefit and not you.

UNDER-DRAINAGE AND ITS ADVANTAGES.

By Mr BAILEY DENTON.*

AVING written and said so much on
the subject of under-drainage within
st twenty years, and having been con-
l with drainage works in various parts
country, which, in the aggregate, have
iore than a million of money, I should
een indisposed to enter again the arena
ussion, were it not that I have thought
ie results of my experience might be of
general utility. I am led to think this
se the progress of under-drainage has
gone a check within the last few years,
auses upon which some useful remarks
e made, particularly as we are on the
a wide application of the liquid refuse
ns to land by irrigation, or intermittent
on, the permanent success of which
application principally depends upon
y in which the necessary under-drainage
ormed. The check which has been ex-
ced has not arisen wholly from causes
cted with the operation of drainage,
m the coincidence that there has been
last five or six years a succession of
ratively dry seasons, including the two
f absolute drought of 1868 and 1870,
at every operation involving manual
has greatly increased in cost within
ne period of time. The occupiers of
onsequently have been content to leave
eavy lands *un-drained*, on the principle
ting well alone," instead of acting upon
etter axiom of economy—applicable
y, and with special force, to under-
ge—of "providing against a rainy day."

FECTS OF A "LET-WELL-ALONE" POLICY.

ed not point out at length the pernicious
upon agriculture of the "let-well-alone"
but will merely remind you of two facts,
nust go far to confute it in reasonable
The first is that in dry seasons, when there is no surplus water to remove from the soil, land that has become pulverized by under-drainage, in consequence of the admission of air throughout its mass, derives great benefit from the moisture with which the air is charged, even when that air is believed by the uninitiated to be extremely dry. My own observations lead me to the conviction that the advantage of admitting the air with the moisture it contains into the soil during dry years, is practically very great. On the question of utilizing the water of under-drainage in dry seasons, I must not now speak, though with Romney Marsh so near at hand, where I have heard of sheep dying from thirst in considerable numbers, at the very time when I have been draining the high grounds above and throwing away water in large quantities, I could find in this single object matter enough for an evening's discussion. I therefore pass on to the second fact, which I think should dispose of the "let-well-alone" policy, and that is, that the cost of under-drainage is gradually increasing, and is likely to increase even at a greater ratio than hitherto. When I started drainage five-and-twenty years ago, the ordinary cost of 4 feet digging in clay soils was 1d. a-yard, or 5½d. a-rod; it now costs 1¼d., or between 7d. and 8d. a-rod, and the probability is that those who have comforted themselves with letting well alone, will have to pay more when they set to work, for we cannot shut our eyes to the fact that while labourers engaged in agriculture are on the decrease, owing to the more active demands of trade and commerce, efforts at combination are being successfully made to raise wages in rural districts, and this will necessarily extend itself to under-drainage. This is an ugly fact, but it must be looked in the face. The increase too, is not confined to the mere labour of cutting the drains, but to the making of pipes also. I have given as little as 15s. and 16s. per thousand for 2-inch pipes, made as well as any

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d before the Maidstone Farmers' Club.

pipes I have ever seen; now, the price at the same yard is 20s. or 22s. From these several causes the average cost of clay land drainage 4-feet deep has, within my own experience, increased from £5 to £6 an acre, and it will not be long before my "let-well-alone" friends pay £7 an acre.

THE ADVANTAGE OF TECHNICAL INSTRUCTION.

Speaking generally, there is no doubt that the work of under-drainage is better done now than twenty years back, but it is surprising how little improvement has been made in the actual work of digging, though expertness in that, more than in any other description of field labour, might be made a means of obtaining increased wages. Much of the improvement that has taken place is due, not to the improved way in which the trenches have been dug, but to the supervision exercised over the finishing, *i. e.*, the bottoming of the trench and the laying of the pipes, without which the work would be of little or no avail. In fact, a Huntingdonshire drainer would, twenty years ago, cut a depth of 4 feet in the Oxford clay of the Oolite, with an opening of from 8½ to 10 inches, taking pride in shewing how little earth he would thus remove. Now, most men will open the trench at widths varying from 14 to 18 inches for the same depth. I need not tell you that if one man can dig a drain 4 feet deep, and move only 1½ cubic yard of earth in each rod, while another man will move 2½ cubic yards; the former can earn better wages by devoting his strength to a greater length of cutting, while the employer, paying no more per rod, would be advantaged by the greater rapidity with which the operation would be performed. There is often the difference of a yard, worth perhaps 2d. per rod, in the earth moved by one man compared with another. I hope that those who hear me, will accept this fact as an illustration of the advantage of technical education in all farm work, and seeing that what we have done within the last twenty-five years in under-drainage, is but a mere flea-bite compared with what remains to be done, will help to obtain for the farm labourer those advantages of practical tuition which he pre-eminently requires.

UNDER-DRAINAGE AND SHALLOW CULTIVATION.

Under-drainage has been supposed to be a work which, when once executed, requires no help on the part of those who are cultivating the drained land, and that the drains themselves are not liable to any of those casualties which attend the acts of man, though man's best endeavours are but a minimum of defects. It is these assumptions more than anything else that are bringing drainage into disrepute. Lands laid out in ridges and furrows—the form of *surface* drainage adopted by our forefathers, when they converted our woods and wastes into ploughed fields—are still retained, though wholly inconsistent with *subsoil* drainage, and it must be manifest to everyone that so long as the shape of the surface will allow of the rain falling upon it to run from the ridge to the furrow, not only is the latter overloaded with water, and the under-drains placed at a disadvantage, but a system of robbery is going on at the same time, for a large proportion of the manure put on to the ridge is washed by the rain into the furrow, without any capability of turning it to account. It is needless to say that every pains should be taken to reduce the surface to an even condition—not by any rash effort made in one single year, but by degrees, and in several years, until the only furrows that exist shall be those known as "water furrows," which are positively necessary to relieve the slacks and hollows formed by Nature, and in which water will collect, so long as it retains its property of running to the lowest place. No under-drainage can wholly prevent this, and time must be allowed for absorption. In the west-midland and midland counties, the high-backed lands have been so raised that two persons standing in different furrows are unable to see each other, while in the eastern counties such a form of surface is hardly known. Still, though the eastern counties have not to contend with these aboriginal deformities, there exists an indisposition with many farmers to take advantage of their facilities, and cultivate deeply. I have often heard men say that with a poor subsoil, shallow ploughing is better than deep. There cannot be a greater mistake than this, for as long as the pan established by ploughings in former generations is maintained by ploughing equally shallow, the results must be unsatisfactory. As it is, in point of fact, a *sine qua non*, that the surface soil should be broken up by deep cultivation, it is lucky for under-drainage that the gradual advance of steam cultivation will annihilate high-backed lands, and force out of practice shallow ploughing. In making these remarks, I am not presuming to lay down the law as a farmer, though I have had some experience in that line, but I speak as a constant observer of the acts of other men—those who, having experienced its benefits with deep cultivation, extol under-drainage as the foundation of good husbandry, as well as those who, having neglected proper surface treatment, complain of its failure.

HINDRANCES AND DEFECTS IN THE WORKING OF DRAINS.

I can positively affirm that after five-and-twenty years' active investigation I have never known a single instance of failure of under-drainage where the work has, in the first instance, been properly done at a proper depth—never less than 4 feet in clays, and often reaching 10 feet in free soils—and the surface has been deeply and timely cultivated; always reserving accidents which will occur in spite of every precaution and care, and with which I shall presently deal. I have had a great many cases brought under my notice, each proclaimed to be a "failure of drainage," which, upon examination, I have found to be unsatisfactory, owing to causes wholly within the control of the occupying tenants, who have either avoided breaking up the surface pan, or who have forgotten that drainage does not alter the constituents of clay, but merely its condition, and that it is as wrong to plough and maul land in wet weather after it is drained, as it was to do so before. The accidents which are beyond the control of both the drainer and the tenant-farmer are not so readily disposed of. How often have I heard the expression, "Do you call this drainage?" when water has appeared on the surface in consequence of the drains being stopped by tree roots, or by the collection of sand, or of protoxide of iron. In sandy districts, the drains will at times become filled with sand, particularly where there has been a good deal of pressure of water from higher ground, and the sand itself has been very minute. No collars nor any other expedients will wholly prevent the influx of sand nor the choking of the pipes, where the run of water is variable and small in quantity at times. I have in certain cases prevented the passage of sand into the pipe by wrapping the joints in muslin or calico, but this has not always been attended with success, and I feel bound, therefore, to state that, in every possible precaution stoppages will occur, and can only be remedied by taking up the pipes and clearing them as soon as the evil is suspected. Upon large estates all these evils are to be avoided by making a competent man responsible for the maintenance of the whole work, both of drains and outlets. He should be picked out from among those workmen who had been engaged in the drainage when originally executed, and as he would know were to prick for the drains, he would be able readily to remove obstructions. This is a practice I universally recommend, and upon an estate of several thousand acres, a 1d. an acre will amply suffice to keep the drainage in proper order, inasmuch as a handy man receiving 15s. a-week, and devoting five or six weeks in the course of the year upon each 1000 acres would do all that is required. When once this arrangement is established, I find that the tenants are very willing to pay the 1d. an acre, as they have it in their power to have rectified at once anything that appears wrong. With small estates where a man of this sort cannot be retained, it cannot be too strongly impressed upon those who occupy drained lands that to accidental causes and to a lack of proper surface treatment is to be attributed the majority of these consequences which they are too apt to consider defects of drainage. While pointing to these serious, but unavoidable, drawbacks, let me point out another source of dissatisfaction. I refer to the stoppage of drains by vermin, such as foxes, rabbits, rats, and mice, which should be provided against, though it not unfrequently happens that gratings at the outlets, if not attended to, cause an evil greater than the one they are intended to remedy. But perhaps the most fruitful cause of complaint respecting drainage arises from the inattention paid to the clearance of outfall streams and ditches into which the under-drains discharge, and to the maintenance of outlets existing by permission in adjoining properties. It is too frequently the fact that the outlets are not only under water, but that they are blocked by silt, weeds, and other kinds of impediments, which render them at times useless, and it is the obligation to keep the outlets clear of such obstacles, occasionally involving considerable expense, that serves to make deep drainage so unpopular at present.

THE ADVANTAGES ATTENDING DRAINAGE.

Without saying another word in proof of the direct advantage of under-drainage, let me remind you of those natural benefits which, being generally acknowledged, are almost unheeded. I refer to those indirect advantages which partake of the character of improved climate, rather than anything else. Whole districts have changed their character by the extension of under-drainage. Those places which, a few years back, were signalized by constant ague and fever, have become as healthy as the rest of the kingdom, and this is greatly, if not wholly, due to the influence of the drainage of certain large estates upon the locality. As to the effect of drainage on water supply, opinions vary, and we often hear it stated that the scarcity of water in dry seasons, such as those of 1868 and 1870, is due to the drainage of land. My observations, extending over upwards of twenty years, enable me to record an opinion that the supply is increased and not diminished by drainage. I have invariably found that the discharge from drained lands into the outfalls will commence *before* the ditches of an undrained district receive any overflow from its surface. This is, doubtless, due to the fact that the whole of the interstitial spaces of subsoil and surface-soil, which have been emptied of water by the summer's evaporation, have to be re-filled with rain before any water can run off the surface, and the levels of the drains being earlier reached than the ground surface, they commence their discharge proportionately earlier. Hence the rivers receive their first quota of perennial supply from drained lands. I have also invariably observed that the outfalls receiving the drainage of clay lands will continue to flow longer in the spring than the ditches passing through an undrained district of the same character. This may be due to the circumstance that saturated clay soils part very sparingly with their moisture by soakage into open ditches (though they are more disposed to do so when in contact with free soils, which are often thereby rendered productive), for it has been found in practice that the drainage of clay soils cannot be effectually performed by any number of open conduits, though they will part with their surplus wetness directly covered conduits or under-drains take the place of open drains. Let the cause of this be what it may, the facts can hardly be doubted, that the rivers receive from drained lands a contribution to their volume earlier and later, and therefore longer, than they do from undrained land, and that during the period of discharge a large proportion of the rainfall which would otherwise be lost by evaporation is added to the rivers at a time when it is not wanted, and therefore when the addition may be stored, and subsequently utilized when water is scarce, and the flow of our rivers is diminished. I have here spoken of clay lands. It will be somewhat different with bogs and morasses at the heads of river systems. They are, as it were, sponges, which gradually disgorge the rain they absorb and hold, and when drained are reduced in their capacity as reservoirs. But even with these it is more than probable that the quantity of water rescued from evaporation by under-drainage, more than balances the loss due to reduced sponge space.

SEWAGE IRRIGATION.

Having pointed out how readily the best designed works become defective by accident, I must express my regret that the mode of carrying out works under the Improvement Acts has not encouraged more originality of treatment, that in spite of the desire on the part of the Improvement Commissioners to secure the best result, the necessity of acting in accordance with recognized rules has kept us too closely to one particular system. In homogenous soils, whether retentive clay or saturated sand, there is no doubt that a regular system of drainage is the best, unless irregularity of surface should interpose a difficulty, when the treatment should be modified. But equi-distant drains of equal depth are ridiculous, when applied, as they frequently are, to soils and surfaces varying in character and shape. The pertinence of these remarks will be manifest directly we have to treat land as a means of filtering liquid sewage from towns, in addition to the rain from the clouds. After some opposition it is now pretty generally admitted that all land to which sewage is applied, whether by irrigation or intermittent filtration, must be under-drained if the sewage is to pass through as well as over it, as it invariably should. No sewage should in either case descend direct from the surface to the drain, and it will be readily understood, therefore, that the "gridiron" system of drainage in free soils, in which it can be avoided, is inappropriate both for sewage farming and sewage purification. In clay lands, where, from the multiplicity of the necessary drains, it is impossible to avoid running the sewage directly over them, special manipulation is requisite to prevent the cracking of subsoil as much as possible, and when impossible, the direct passage of the sewage from surface to drain. This manipulation is a work of a compound character, involving the preparation of the service soil by proper cultivation, to a depth of from 15 to 16 inches, and by packing the pipes below, so that if the subsoil should still yield to the atmosphere, the crack shall not reach them. The 16 inches of pulverized soil will act on the clay subsoil in the same way as the brickmaker's straw acts upon unburnt bricks by protecting them from the direct action of the sun and wind. But I must not now go into these details, and I only thus cursorily refer to them to express my regret that, now we are entering upon a new phase of the drainage question, we have to admit that we have become too much the creatures of rule and regulation. This is evidenced by the facts that while the sanitary authorities of some towns have been obliged to stop or remove the drains originally laid as an agricultural work in the land they are using for irrigation, the authorities of other places are now copying the system sanctioned by the Inclosure Commissioners, under the belief that it is the best of all descriptions of under-drainage, and is as applicable to the cleansing of large bodies of foul water, as it is to the removal of surplus rain water simply.

THE PROSECUTION OF MIXED HUSBANDRY.

By Mr Joseph Aston.*

WHATEVER mode of farming is adopted, there must be the application of skill and energy in order to be successful, but especially must this be the case if all our energies are in one direction. The altered state of things require agricultural operations should be conducted on principles to meet the necessities of the great consuming public. Still, there must be great caution exercised against rushing from one extreme to another, the result of which would overstock the markets with such commodities for which there was but small demand. If agriculturists were more careful in purchasing and disposing of stock, and would lay up in store for dry summers and hard winters, there would not be such great fluctuations in price as frequently take place within short intervals of time. Stock should be sparingly bought when dear, and rather freely when cheap, which would soon regulate prices. And it is wise to sell when others in general are holding, and retain when nearly all are selling. Farmers act very unwisely in forcing stock so much beyond their real value at public auctions or elsewhere. A foreigner might reasonably conclude that rent, taxes, and wages were low and agricultural produce very high in England, when witnessing such scenes as frequently take place when persons get fresh on gin and beer.

THE VARYING CONDITIONS OF CULTIVATION.

The aspect of farming in Cheshire is different to what it was some years ago. Under existing circumstances it would be very adventurous to keep a large dairy or feeding stock, or have all the land devoted to tillage purposes, as such great changes are continually taking place. Mixed farming is highly to be commended, and is undoubtedly the safest and most judicious course for agriculturists to pursue. Though all my land is down in grass, and I mostly keep a good quantity of cattle for dairying, feeding, and store, still I would not recommend others to adopt the same plan unless occupying very stiff and thin-skinned soils. The vast quantities of American cheese which of late years has been pushed on the English market, lowering the price of all descriptions, but especially the medium and common qualities, presents a new phase in Cheshire farming, and should induce us to turn our attention to such modes of culture as shall meet the growing necessities of the times. Mixed farming appears indispensable at the present time to meet the great fluctuations that are continually taking place in agricultural produce. Where land is adapted for dairying and feeding, our attention may be directed to both, so that if cheese is dear and beef and mutton cheap, we shall gain by the former if loss is sustained on the latter. And, on the other hand, where large farms are suited for corn growing, dairying, and feeding, the occupier's position is still more safe and secure. It is not wise to make cheese and grow corn in the immediate neighbourhoods of London, Manchester, and Liverpool, where new milk commands high prices, and to cart it out of districts where railways are not contiguous, is attended with great inconvenience and considerable expense. There are some districts and farms better adapted for one purpose than another, and due consideration and good judgment ought to be exercised before deciding on plans for action. Some persons have no liking for corn growing, and it must be a matter of necessity to induce them to engage a tenement specially adapted for the purpose. There are others who are not favourable to dairying, and in order to be successful it is advisable, as much as possible, to enter on

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* Read before the Over Agricultural Society.

;s suited to our different tastes and in-
ns.

TILLAGE FARMING IN CHESHIRE.

not hesitate to condemn the antient
of summer fallowing, and having to
o years' rent, taxes, wages, wear and
ith one year's profit. There are hun-
ınd thousands of broad acres of land in
ire I would not prepare for seeding on
re-mentioned plan, if rent and tax free,
attempting to cultivate such soils that
een so impoverished with the plough
tion after generation, is a waste of time
loss to the community. Nor would I,
le, advocate the improvement of them
under tillage, but renew the constitu-
f the soil with manures after being laid
to grass. Slight as may be my acquaint-
vith tillage farming, I know too much
back to the old system of summer fal-
on stiff clay soils, for when a juvenile
frequently seen Rodger and Juke, two
as stout as steel, groan nearly every
they made in some ploughings when
asons were unpropitious, and the result
m 10 to 12 bushels of wheat per statute
ınd in a few instances only 6 or 8 were
d, which did not pay for labour, con-
ıtly nothing was left for the landlord
x collector. I disapprove of tilling the
st land on the farm, but if convenient
take the best for the purpose, which
ve treble the return, and be cultivated
expense. The exhausted fields should
d down clean and well seeded, and then
ved with farm-yard manure and bones,
which they will be adapted either for
ng or feeding. For upwards of thirty
it has been our invariable custom to
h the best land and improve the worst
e manner already stated. On ac-
of not growing any turnips and man-
and but few potatoes, the following
d was usually pursued. 1st, oats on
2d, wheat after pinfallow; 3d, oats;
clover, which sometimes was mowed
on other occasions once if only one
taken, a pinfallow was made, but in
case sown with wheat. After a few years of experience it was found the clovers were not so healthy and strong after three corn crops as four, and by taking another between the clovers produced a good effect. A bean crop might have been grown with advantage in the courses. The young clovers were either manured or dressed over with boiled bones well crushed. After following this method for about twelve years, the land was put down for permanent pasture, well manured and boned, which restored it to its former fertile condition for dairying. Free soils, as a rule, are better adapted for tilling, and do not present so many difficulties to the agriculturist as stiff clays; roots with advantage may be grown in the courses, and where one acre of the former is in tillage there ought to be three of the latter. Still, Mr Mechi, with deep ploughings and a large outlay, has overcome difficulties which many others at the present time are not able to surmount. Science of late years has thrown a deal of light on agriculture. It has been proved, by the application of suitable manures to land, it will grow the same grain to an indefinite period without any diminution in the crop. Still it is doubtful, if it pays to incessantly till, as cereals are so exhaustive to the soil.

PROFITABLE STOCK FARMING.

I scarcely need remind you I have stronger predilections for dairying and feeding than tilling, still, if one branch of agriculture is fraught with greater consequence than another, it must be given to the latter. People can live in some way without cows, sheep, and swine, but must drag out a wretched existence if deprived of the staff of life. Wheat is the most valuable article which nature produces, and indispensable for the sustenance of mankind, and while I would freely give place to the cultivator of the soil, still there are other branches in farming husbandry that require application and good management to be successful. To make good cheese and butter, there must be good grass, rich milk, and skilful application. The cattle should not be too high bred nor too low. They ought not to be over large nor very small, but characterized for equal proportions, and possess good milking properties. It is not wise to purchase cattle lean of flesh, long in the leg, and contracted in the chest, either for dairying or fatting, and this will apply with equal force to horses, sheep, and swine; stock round in the rib, thick in the body, and rather short in the leg are generally hardy in the constitution, will fatten quicker, and pay best for keeping. I would not recommend farmers occupying wet clay lands to purchase large high-bred cattle, partly on account of the additional damage they commit in some seasons, and partly on account of the extra food they require to keep up the condition. They are best adapted for rich alluvial soils and dairies in towns and cities. None of my dairy cattle are beyond a good medium size, and only about one-third reach this standard. Still, last season I have made upwards of 4 cwt. of cheese, long weight, per cow, besides supplying the house. I consider four large cows will consume as much food as five moderate ones, but the profits will not be so much, and the risks of keeping greater. To farm successfully we must farm well. Land is honest and will repay for an outlay. Drain wherever it is required; manure freely; cultivate well—then stocks will thrive and fatten, crops will be luxuriant, milk will be rich, and cheese and butter, with proper management, be good. It is waste of time to enter upon large poor farms without cash to improve. I should prefer occupying 100 acres of good land to 300 that were exhausted. Stock, rent, taxes, and wages are high, and there must be high farming or it will soon become a losing game.

THE ADVANTAGES OF MIXED FARMING.

To feed to advantage, the herbage must be rich, the stock healthy and of good quality, and discriminately bought in and well sold out. Instances have been known when stock were high at spring, and low in the autumn, that little or no profit was left for a summer's keep. My feeding is chiefly done through the spring and summer months, and at a small expense in labour. I mostly commence buying stirks about February, and continue to do so through March and April, as my land will bear them, and, when there is a fair bite of grass, fill up with barrens and pick-calvers out of my own stock, and purchased elsewhere, with a few sheep in some years, when there is an abundance of herbage. Mostly those fit for the butcher are disposed of by the end of September, and such that are adapted for store selected at the close of the year to fill up the places of turn-outs in my own dairy. Since giving up tilling and feeding a little, I have frequently been asked if it paid. My invariable reply up to last summer was, it did, but not so well as cheese-making. But in consequence of a change taking place in the cheese-market last season, feeding paid better than if I had realized 80s. per cwt. for my dairy, which was very improbable. I have adopted rather an unusual mode of farming which would not be for the interests of all to imitate. I neither plough nor rear, but purchase all my straw and corn and cattle for dairying and fatting. In some seasons I am a great gainer by so doing, but in others I lose. The profits on feeding last summer were exceedingly large, but according to present appearances will be very small this year, consequently I have bought sparingly for this purpose up to the present time. All kinds of stock fluctuate in price, but none so much as store pigs. Sometimes they will sell for nearly treble their real value, on other occasions for about one-third what they cost in rearing, but the average of seven or ten years will give a profit on breeding pigs. We live in very critical and uncertain times. All descriptions of stock and produce are alternately high and low, and it is not wise to depend entirely on any single branch of farming husbandry, but make careful and proper divisions, resting assured, as seasons revolve and changes take place, all in due order will give a proper return. Irrigation is carried on successfully in some places, but instances have been known where it does not pay for the outlay. Liquid manure diluted with water run over the land, produces abundant crops, still it is very questionable if the former pays for the expense of lecting and carting on at the present high :e of labour. Growing early potatoes and er vegetables where land is suitable, is hly remunerative, and this class of farmers ear to be on the increase in some parts of eshire. Selling milk at 8d. per gallon, ecially through the spring and autumn nths, is much more preferable to making nmon and middle class cheese at the sent time. Still, if first qualities can be duced, they will pay better than depriving farm of such valuable ingredients as milk, ter, and whey. Unless more successful n myself, the more sparing you are in pur- sing artificial manures the better. I do consider guano worth the price now rged. If it could be bought on the same ns as formerly, there would be a good re- n for the outlay. I never considered the t to be worth more than £9 per ton. All sphates made available to the soil may be erally used freely. They are permanent rovers, and mostly answer well in this nty. Farm-yard manures are invaluable all lands, and we should continually k to augment their fertilizing powers purchasing plenty of feeding stuffs. e using of feeding stuffs, farinaceous ds, and artificial manures, have to do more ess with mixed farming. No doubt cakes better for some purposes than grain, and latter has the advantage over the former for others; all have a wise and important purpose to serve, and if discriminately used will answer the end for which they were given. Stock will shine better, fatten quicker, and be more healthy on a change of food. Mixed feeding is as essential to success as mixed farming. I have tried linseed cake for fattening pigs, but met with small success; and cotton seed cake well crushed as it came from the hands of the manufacturer, for manuring, but it proved a failure. Genuine farinaceous foods are serviceable for stock out of health and poor in condition, but there is no necessity for continual use when in a healthy state. About seven years ago, in the presence of several respectable farmers, I separated fifteen pigs, and put nine of equal value in one stye, and six in another. All were fed alike, with the exception of nine being put on the prescribed quantity of Simpson's spice. Scarcely any difference was manifest for five or six weeks, at the end of which period the nine did not consume their usual quantity of food, and failed to fatten so quickly as the others, and by the time they were ready for market only ate the same quantity of meat as the six. The ultimate result was that the nine fed on spice were, at the very least, two scores lighter than those which had none, and on their being killed it was found some of the internal organs were very seriously affected.

COVERED COURTS.

LETTER in reference to the discussion about the best mode of putting cattle, has been addressed by Lord naird to Mr Hope, Fenton Barns. Lord naird has long been an advocate of ered courts in preference to any other de of disposing of cattle, and the results e been very satisfactory. Many years ago M'Laren, Lord Kinnaird's then factor, te an essay on this subject in the *nsactions* of the Highland and Agricultural Society, and the views and facts therein stated induced many feeders to follow his lordship's example. From personal survey, we can state that the courts on the home farm of Rossie Priory fulfil all the conditions that the noble lord claims for them. He says to Mr Hope:—

> I was rather surprised in reading the report of the meeting of the Haddington Farmers' Club that there was a discussion on covered courts, and that doubts were expressed on the subject

by some of those present with regard to the general advantage of such a system. I have no hesitation in recommending as the result of a large practical experience the adoption of covered courts in *every point* of view, whether for feeding in winter or soiling cattle in summer. If these courts are covered with open pantiles not bedded in lime, and plenty of glass ones for light, the most perfect ventilation is obtained. I can speak from an experience of twenty years, not only as to the health of animals, economy of feeding, and, above all, the value of the manure. I published on the subject, in 1853, a detailed account, with plans, of a steading having all the courts covered in—by far the cheapest form of construction of farm buildings—and the particulars of a very careful experiment on a field of 20 acres equally divided, a rich loam lying on the trap. Two acres out of each 10 having been carefully measured, gave the following general results :—

POTATOES GROWN WITH UNCOVERED DUNG.

1st measurement of 1 acre produced 7 tons 6 cwt. 3 lb.
2d ,, ,, ,, 7 ,, 18 ,, 99 ,,

POTATOES GROWN WITH COVERED DUNG.

1st measurement of 1 Ac. produced 11 tons 17 cwt. 56 lb.
2d ,, ,, ,, 11 ,, 12 ,, 26 ,,

The next year the weather was wet, grain soft, and not in very good order ; but the following was the amount of produce.

WHEAT GROWN WITH UNCOVERED DUNG.

Acre.	Produce in Grain.	Weight per Bushel.	Produce in Straw.
First......	41 bush. 19 lb.	61½ lb.	152 st. of 22 lb.
Second..	42 ,, 38 ,,	61½ ,,	160 ,, ,,

WHEAT GROWN WITH COVERED DUNG.

Acre.	Produce in Grain.	Weight per Bushel.	Produce in Straw.
First.........	55 bush. 5 lb.	61 lb.	220 st. of 22 lb.
Second.....	53 ,, 47 ,,	61 ,,	210 ,, ,,

With these results, and the appearance of the manure when carted to the field, I have never doubted the great value of covered courts so far as manure is concerned, and long experience has proved them of great advantage to the health of the animal, whether in being fed for the butcher or reared for the grazier, coupled with great economy of food and labour. In other words, beef can be produced under this system at the least cost, especially if the cattle are placed in boxes. One man with a small steam-engine, at a cost of coals under a shilling per diem, to bruise oats for horses, cake for cattle, cut chaff, and *pulp* (not *slice*) turnips, with the occasional attendance of a boy or girl—say on Saturday, when a double portion of food has to be prepared—can attend to three times the number of cattle in boxes than if tied up. I was not prepared, save on this latter point, for the great advantage of box over byre feeding, till I read the very able report of Mr Moscrop in the *Transactions* of the Highland and Agricultural Society of Scotland (vol. iv., page 156), all of whose statements I can confirm, and I have no hesitation in saying that it would pay a tenant to cover in courts at his own expense. Two rows of boxes, 10 feet square, to hold one fat stot or two young ones, with a 4-feet passage in the centre, and to contain fourteen boxes with feeding and water troughs, gate and moveable spars, and large door for carting out dung, door at end of passage, would cost £140, or £10 per box. If a double shed is erected, each shed should have an inclination of about 18 inches, so that, instead of lead, a narrow iron gutter answers to carry off the rain water.

In the letter which conveys this information, Lord Kinnaird intimates his sympathy with Mr Hope on his being obliged to leave his farm, on political grounds, which we have reason to believe is not the case.

A SUCCESSFUL SEWAGE IRRIGATION FARM.

IE success of the Aberdeen Sewage Irrigation Farm, on the Spital lands, ie *Scotsman*, promises well for the sea- w begun. The laying out of the whole or irrigation purposes was completed a year ago, and somewhat over 44 acres un with sewage last summer. Ten acres under potatoes, and the rest about allotted to the produce of turnips and

s year it is intended to double the e under grass, and to devote the re- g few acres to turnip cultivation. The es grew well last year, but when they ug a large proportion of the tubers otten, so this year potatoes are not to nted. The 17 or 18 acres which raised n 1871 have already got two courses of werage, and the grass is well up. It es about 8 inches in length, while one ed patch is all but ready for the scythe. the present week grass cutting egin and the yield is likely to be on the greater portion of the land. owing of grass was commenced about ight ago, and will soon be completed. arious patches were well grubbed by lement yoked to a pair of horses. By ne means harrowing is accomplished, er the grass seeds are deposited, the is rolled, horses being used in this lso. The corners that cannot be d, harrowed, or rolled by horse-power, ed by manual labour. So far as the have been sown this season, about a of rye to every four of grass seed was ed, with the view of sheltering the and tender grass. Italian and Ayr- e-grasses have been used. The soil nostly of a loamy and rather light an excellent mould has been secured grass seed. When the sowing of d is completed, the area under grass about 36 acres. This should produce —cut four or five times in the season—as can be profitably disposed of. Last year the cowfeeders used the grass; and, mixed with hay, carters gave it to their horses. More of it could have been sold toward the close of the season, when its value began to be fairly ascertained, so that there is every probability of the demand this year being equal to the supply.

Several of the patches where dampness was manifest have been underground-drained lately, but there are still one or two spots that would be greatly benefited by similar treatment, for experience has proved that sewerage irrigation cannot be successfully applied to soil in the least degree inclined to dampness.

About 8 acres are to be sown with turnips. The facilities for cleaning the land being greater under a turnip crop than any other, the portions where weeds are very plentiful have been selected for the produce of these roots. These plots will be grubbed and harrowed by horse-power; but the forming of the drills must be performed by the spade, and the sowing and rolling also accomplished by manual labour. Swedes and yellows were tried last year, with results in favour of the latter, which is accordingly to be used this year—Aberdeenshire Bullock yellow being the seed selected.

The preparation of the land for the different kinds of seed deposited in 1871 was effected entirely by manual labour—spade and graip culture. By this means the work was satisfactorily done; but the amount of labour involved was great, and more costly than the application of horse-power recently introduced. The land, too, seems to be better cultivated by the latter mode of tillage. Of course the operations with the horses are greatly impeded by the prevalence of sewage ditches, but with perseverance and careful management these difficulties can be overcome. Only three or four men are employed on the farm, and the horses' work has been contracted for.

AGRICULTURAL JOTTINGS.

By Mr J. J. Mechi.

ENCLOSED, AND PAVED CATTLE SHEDS.

re just clearing out one: it con- ined the five months' manure of ighly fed cattle—not a drop of allen on it or drained from it. It ather forks out, short, and not h, moist, and greasy. It goes at land, is being spread, and will be n for roots, two horses drawing ugh, and four horses pulling, in ack or furrow, another plough, reast or mouldboard. Here we shing, mangling, and drying, no dung-heap, turning over and re- carting: not an insect can live or and I look upon this as one of portant advantages of the system, ng-heaps are the breeding-places As to quality, no guano or bones re with it. Why does not this nd? It is both economical and nd especially promotive of profit ding and stock feeding on heavy armer can thus well afford to pay 5 or 6 per cent. for the cattle e landowner will find his tenant o pay his rent: 10s. per head per ach bullock would be about the sets free some three-fourths of r other purposes, and economizes and manual labour and time. ould be paved and cemented.

WIREWORM AND SALT.

ls, or about 3 cwt., of salt per broadcast, stopped their depre- e light land, and 2 cwt. did the heavy land, for they attacked n that land after clover twice only once ploughed for wheat; vy land we were obliged to salt able to use our Crosskill roller. The wheats on both light and heavy land, despite the wireworm attack, now look well. No light land farm subject to wireworm should be without Crosskill's clod-crusher, rendered more heavy by 5 cwt. of iron bolted on the back frame to balance the shafts; this, and salt, is a certain settler of the wireworm on the lightest soil—roll first and then sow the salt. You may safely go up to 5 cwt. per acre on light land, drained naturally or artificially. Look out in good time for the worm, or you may be too late. Clover leas twice broken up on a heavy land are generally free from slug or wireworm. The fine weather has so well dried our land that I am now Crosskilling the salted wheats, to finish up the few remaining wireworms that escaped the salt. Crosskill is a most valuable fellow on light, or even in some cases on heavy land. Mine is thirty years old, and has still a good constitution. There is one disadvantage in using a very old Crosskill—the points get worn down and rounded, and do not penetrate so deeply; we, therefore, in the case of wireworms, have to go over the ground twice—in opposite directions. This and the salt are a certain cure for wireworm. Even after the salting, we found as many as four wireworms at some of the wheat roots.

DRAINAGE AND NON-DRAINAGE.

Will this spring present a very marked and unprofitable contrast, especially on our stiff non-calcareous collapsing tile earths or clays, which, even where drained, are not easy to work. There is an old saying that "It is not getting drunk that hurts the land, but the getting sober again;" of course, where there is no hole in our agricultural flower-pot, the excessive supply of water cannot pass through, but remains and stagnates, excluding air, and waits for the sun's rays

ate it—thus misappropriating the heat
should have permeated and warmed
ltivated soil. We all know how much
plants suffer by having their roots in
nt water. I am convinced that deep
ition, by loosening the lower or
l, greatly facilitates the passage of
to the drains and permits the
ramification of plant roots. It was
yesterday that a very considerable
r and owner of tile earth or stiff non-
eous clays asserted and maintained his
that drainage was of no use in such
ous soils. He is by no means alone
county as to such an erroneous and
fitable opinion. A bushel of wheat at
sent price, 7s. 6d., would pay the an-
harge per acre for perfect pipe drainage.
want of it this year will lose many
ls per acre. The economy of time and
tunity of working the land after so much
would, alone, almost pay for the annual
for drainage. I am enabled to get in my
crops before some of my neighbours
lands are undrained.

TAMING THE SHREW.

know that Irish cattle are rather wild
piteful. A couple of heifers which de-
d in driving and disturbing the English
orns in our covered yard, were after a
removed and placed in two of our
d floor boxes; most violent and indig-
were the young ladies, but vain were
efforts to escape, in a day or two they
it very much more convenient to take
iet life and comfortable repose on the
or spars. The contrast was striking
musing, and certainly very profitable,
ey progress in condition very much
than before; wild Welsh or Highland
would no doubt subside in the same
Twenty-five years of experience with
arred floors have confirmed my favour-
mpression and calculation, the only
ack is that owing to their enabling us
p so much more stock, it requires the
l invested in live stock to be doubled
oled. Of course, the manure would
in a like proportion, and the produce would increase with the manure. I think the time is passing when farmers lamented the absence of rain on their farmyards, and felt anxious to know how their straw would be rotted.

HOW SOME OF THE FARMER'S PROFITS GO.

There is scarcely one department of farm management more important than that of the purchase and sale of live stock, more particularly the selling of fat stock, and I am satisfied that as a rule a farmer is very unsafe when he trusts to his eye-judgment, for he has to contend with the practised butcher or trader, who has everyday experience, especially as regards slaughtering. Wishing well to my brother farmers, I am induced to make these remarks, because I have often observed that the judging of weight of my animals by various farmers who visit my farm shows a discrepancy of from 10 to 25 or more per cent., and convinces me that the scale is the only true guide. Many farmers are unable to tell me the difference between live and dead weight, and some seem surprised when I tell them that a half-bred sheep (Down and Cotswold) at this period of the year will barely exceed one-half its live weight, if weighed fasting in the morning. The cost of weighing a flock of sheep is a mere trifle, and may save many pounds. I occasionally first weigh and then slaughter an average sheep, and so arrive at a confirmatory conclusion. Farmers who are not judges of weight get heavily victimized. A striking instance in proof of what I say has occurred in my neighbourhood within the last fortnight—200 sheep passing through several hands to the London market, left in a few days a profit of £200 to the intermediate purchasers. This the farmer might have saved by sending them direct to London, had he known their proper value. Such cases are not very uncommon.

Those who desire to be safe in this matter should consult the late Mr Horsfall's two excellent papers on dairy management and cattle feeding, and Mr Lawes' valuable and comprehensive experiments and calculation of proportions of weight of all the parts of sheep, pigs, and cattle. All these are to be found in the *Journal* of the Royal Agricultural Society of England, which are full of practical agricultural experience, and it does certainly astonish me that so few of my brother farmers are aware how much they would benefit in pocket by receiving, as members, a "gratis" annual volume of that useful society. Mr Horsfall invariably sold his cattle by live scale weight. To novices or young beginners in agriculture I would especially recommend their selling, and, if possible, buying by live weight. How small a per centage of farmers have the suitable weighing machines, and yet nothing on the farm would pay so large an interest for the investment. No farmer should be without a newspaper containing market prices of corn, meat, wool, and other agricultural produce.

THIN SOWING, WIRE FENCING, AND POULTRY.

Thirty years of agricultural practical observation and reflexion should be worth something. Well, then, I am convinced that the wire fencing put up for me nearly thirty years ago by Messrs Garrett, of Leicester, is a profitable agricultural investment; for there it is now, almost as perfect as when first placed, and likely to last for many more years. The fencing is about 4 feet high, and consists of seven wires about as thick as a tobacco-pipe, strained tightly in lengths of some 200 to 300 yards. It is bullock and sheep proof, and is so light that it does not obstruct the view. It has no roots or fangs. The gates are simple and uncostly; I think it cost about 2s. per yard, when iron was cheap. Well, under and through these wires my poultry (some 300) have free access to the fields, and yet close to the fowl-house are my corn fields, drilled with 1 bushel of wheat per acre, unprotected, and unmolested by what some people would mistakenly call the very mischievous poultry. There were even my 2 pecks of wheat per acre (drilled) all last year, undisturbed by them, which yielded 6 qr. per acre of white wheat; and now, again, on the same field, are 2 pecks per acre of Rivett wheat to follow the white wheat. The lines look perfect, although the poultry are almost daily on the field; and it is very difficult to distinguish, even on this early growth, the 2 pecks from the adjoining 4 pecks. All this convinces me that thin sowing and plenty of poultry are both farmers' friends. A certain portion of pasture is as necessary for poultry as for sheep or cattle, and they thereby enjoy mangold wurtzel. My poultry always have free access to my fields. I admire their persevering search for the insect tribe and flies. They lay more eggs when fed upon white peas instead of barley. No fear of wireworm where the poultry go. They look dangerous spread over the field immediately after drilling, but they are conservators of the crop. How is it that there is so little poultry in this country? We import about 1,500,000 eggs daily.

COTTAGE ACCOMMODATION IN THE RURAL DISTRICTS.

THIS is a subject which is particularly interesting at the present time. For many years, people who had regard for the welfare of the rural labourer, urged that their cottages were not in the comfortable condition they ought to be; and landlords, in many places, endeavoured to make improvements in this matter. We hold that the duty of providing suitable houses for the labourers on a farm belongs more to the owners than the occupiers of the soil, especially where yearly leases prevail. The agricultural "strike," and the discontent existing in many parts of England, are due, somewhat, to the want of cottage accommodation. When a man has to walk 3 or 4, or more miles before he reaches work, there *is* a grievance that the landlord ought to settle, or, if he do not, ould help the farmers towards a settle- . It cannot be expected that men who their farms from year to year only, d expend much upon permanent build- With the kindest intentions towards : who work for them, farmers cannot l to lay out money on the erection of ges with tenures so insecure as many They know full well the labourers ot devote themselves with that energy ie farm they would display had they ortable dwellings in the vicinity of their —that an hour's walk deteriorates their ition, which is, of course, a loss to the oyer and an injury to the employed.

od cottages in the vicinity of the farm, gardens attached, and the option of ing a pig and a cow, or allowance to be for the cow's keep, say of £6 to £8 ally, would, in our opinion—notwithstand- ll that has been said against the *truck* m (which in the agricultural districts, as iave pointed out, is not a bane but a it)—go far to satisfy the wants of mar- agricultural labourers, and make their onships with their masters in every more comfortable than they are.

Scotland, where there are leases of from en to nineteen, and twenty-one years' ion, farmers conjoin with their landlords lding cottages for their married servants; nder a yearly tenancy such recipro- annot be expected. It would be in- ous in occupants to expend anything in rtage of stone or bricks, and lime for a ge, if they knew not that it would be in control after it was built. It is true enants without lease have lived for gene- is on an estate, but they must always be the dread that, in the course of nature ccident, another king may arise who is uainted with Joseph, and therefore all anent improvements are done at their isk.

ny landlords in England, we are glad y, have been endeavouring to their ut- to supply the lack of labourers' accom- tion on their estates. Within the last y years the number of cottages erected een large, but the demand for them is very far from being supplied. This arises to a considerable extent from the prices of the erections; but of late much has been done to reduce the cost.

To our thinking a great fault committed in the construction of cottages is to make them of one uniform size, and to expend too much upon ornamentation. Mr Birch, who writes very sensibly upon the advantages of better house-accommodation for rural labourers, and who supplies us with very attractive plans of cottages, is rather carried away by his architectural predilections at times. He says:—"The smallest hamlet on an estate ought to be in keeping with the mansion, and denote, by a picturesque rusticity, the purposes to which it is devoted." Now, all mansions are not picturesquely rustic, and the expense of building hamlets and homesteads after the pattern of the proprietor's residence, would be more in many cases than the ancestral domain could well afford. The wants in the rural districts are houses well and substantially built, sufficiently drained, and with ventilation and sewerage better than many picturesque mansions and their humble imitations at the present day supply; as all know from the discussions about the cause of the unfortunate illness of the Prince of Wales originating at Scarborough.

Cottages, and good cottages, can be built at a smaller sum than Mr Birch sets down. Many years ago we had a survey of the cottages throughout the principal districts of Scotland, and we found some admirable buildings finished at a cost of £100 each; several very suitable ones at from £70 to £90. The description of these £100 houses we refer to, attracted the attention of Dr Mitchell, the Commissioner of Lunacy in Scotland, and we believe that some after the pattern were executed for out-door imbeciles. It is an entire mistake in rural-economic architecture to build houses too gaudy or too large. The requirements of the occupants, and the length of the proprietor's purse, are matters which agricultural architects too often leave out of the question, to the detriment of the two classes they stand between. A large number of the cottagers, finding they have not the accommodation others enjoy, are dissatisfied; and the landlord, finding the expense of such model dwellings as he has built very great, is annoyed because he cannot afford to proceed any further in this way of improving his estate.

We observe that some of the "Specials" have been "interviewing" the cottages and bothies in Scotland, and expressing their sentiments thereupon in a very decisive manner. With their conclusions we venture to differ. Nine years ago we expressed our ideas about the dwellings of rural labourers before the Social Science Congress at Edinburgh, and they were generally concurred in by practical men present. They were to this effect—that it was a great mistake to build too large a house for a ploughman. He does not like it for two reasons:—1. Because he is not able to furnish it. 2. Because its emptiness makes it colder than a smaller house would be, and more firing must be consumed. Often have we been told by farm-servants living in the most commodious and tastefully designed cottages in the rural districts, that "the hooses were owre big an' owre gran' —puir ploughman no' being able to pit sticks intil them," and in some of these houses we found the principal apartment used as a store-room for potatoes and firewood. Uniformity in the size of cottages we then objected to, as we do now, knowing that Providence does not favour every mother alike in the way of children.

The bothy we approve of—with this provision, that the bothy shall be a good one; not the wretched, tumble-down, damp, dirty, broken-roofed hovels some of them are, nor the pestiferous-reeking stable lofts which do duty for the accommodation of unmarried men in some districts. Such bothies as we desire to see are houses on the farm steading with a large living and cooking room, and a separate room for each man where he can retire, if he so chooses, and study undisturbed. To abolish, or attempt to abolish, the bothy system in Scotland, under present conditions, would be folly. All men cannot be married who work on the farm—the complaint is that, as a rule, they marry too young—and if they were all married there would not be a sufficient number of cottages on the farm-steading for them to reside in.

The allegation that the bothies are hotbeds of vice, we have over and over again, on the conclusive evidence that the Registrar-General of Scotland's Returns supply, shewn to be quite untrue. Scotland, with all its religious, or, rather, we should say, ecclesiastical fervour, is not at all particular about the commandment regarding chastity; but the bothy counties are, on the average, 3½ per cent. less immoral—as far as animate witnesses of shame prove—than the counties in which the farm kitchen and the cottage arrangements prevail.

Every bothy man with whom we have conversed, and they have been many (and by no means lawless, ignorant, drunken men, to whom restraint would have been irksome), have preferred the bothy to living in the kitchen, or in the ploughman's house where they were surrounded by squalling children. Some men we have known, who have risen to positions of trust and responsibility—to the rank of factors—have ascribed their promotion entirely to the opportunities which the bothy afforded them for self-improvement.

But there is great lack of good cottages and good bothies. This supplied, a better relationship than that now existing between landlord, tenant, and labourer, would be established; but simpler and less expensive plans of rural houses than most we have seen, are needed before this desideratum can be sufficiently obtained.

THE ALLOTMENT SYSTEM.

T the last meeting of the Stowmarket and Central Suffolk Farmers' Club, subject for consideration was "The nt Allotment System—is it generally ficial to the agricultural labourer?" Mr . Grimwade made the following remarks roducing the matter:—

had for forty years espoused the of letting allotments to agricultural rers, principally as one application e golden rule—doing as he would lone by. It might fairly be pre- d that any plan, simple in its initia- like the allotment system, would be d by all philanthropic and Christian as a boon charged with hope for the in the dissipation of the "idle cor- which has in past years been the bane any a village, and which in many exists e present hour. He referred to the ad- y of the system by the late Sir Edward ison, who was one of the first to give lse to the movement, and who charged per acre, which included all outgoings. tenants on the estate were quite satisfied the system. In reply to inquiries ad put to the Rev. Dr Wicken re- ing the system in the parish of on, the rev. gentleman had men- d that the labourers generally con- ed allotments very useful and beneficial, t on any vacancy occurring there were ally several candidates. The minimum o rods to each man, the others rang- rom 20 rods to ¼ of an acre. The l rent for 10 rods was stated to be 3s., or more in proportion, the ground being from all other charges whatever. Mr wade then noticed the efforts made by te Debenham Farmers' Club to stimu- competition among the occupiers of ge gardens and allotments, and related had been done by himself and the late r of Stonham, the Rev. C. Shorten, in vn parish. Mr Grimwade arranged, with the consent of his landlord, to give up 9 acres of his farm, and the clergyman agreed to rent the land and let it to the poor at 3d. per rod. The fields wanted draining, the expense of which was apportioned over all the allotments. He then set out the fields into 52 allotments, varying from 20 to 30 rods. This being done twenty-eight years since, they would readily believe in the necessity for re-draining it, and the marvel was that during last summer several of the tenants applied to him to use his influence to get it drained upon the Government plan of the 4-feet tile draining. He told them he thought he could accomplish it, but the chief difficulty was in the carting of the necessary pipes from Needham market to the spot. By an appeal to the farmers this was done, and in November the pieces were effectually pipe-drained, no doubt the first in the county, if not the first in the country, upon the plan. The expense of this being considerable, would be recovered yearly by a drainage-rate; and this was a striking commentary upon deep drainage, knowing the strong prejudices that exist amongst labourers as a class against any departure from the 30-inch draining. A diversity of practice existed as to the nominal landlord of the allotments; his opinion was in favour of the minister of the parish being recognized as landlord in preference to any one else, as it was calculated to exercise a salutary supervision over the daily habits of the tenants as well as bring the minister oftener into contact with his poorer neighbours, which could not fail to be productive of mutual benefit. Referring next to the question of requiring the payment of rent in advance, he said to do so might appear suspicious on the part of the landlord, but that was merely ideal, as the practice would entail no hardship on the tenant, whilst if the land was let by the clergyman of the parish, it would be of the greatest value to him to be free from all risk in being brought into pecuniary disputes with his parishioners for arrears of non-payment of rent; and besides, the precedent of partial or entire forgiveness would be fraught with ruinous consequences to the landlord. It was desirable that an opinion should be expressed as to the maximum quantity of land which should be let as a single allotment. The quantity ranged from 20 rods to 2 acres, but it would be apparent to most practical men than any quantity above an acre was loaded with objections, if, as he conceived it ought, it were cultivated by the spade. There were still dissentients (he would not say opposers) from the system. It was alleged that unscrupulous men were to be found in every village, who, to reach a distant allotment, were habitual trespassers in making paths across fields and breaches in hedges, and he was very sorry he must subscribe to the truth of this. Another objection was that holders of allotments were tempted to spend their early morning hours in labour upon their allotment before presenting themselves at six o'clock to receive their employers' orders, owing to which they carried a partially spent frame through the course of the day. He imagined this to be rather difficult of proof, and he must remind that within the last fifty years the laws and habits of society had become so transformed, and they must no longer expect to be indulged in their own particular, it might be peculiar views.

A long discussion followed, in which all the speakers approved of letting labourers have a small portion of land as an allotment. Mr Moore described the manner in which the allotments at Needham market had been conducted, and spoke of the good effects which had followed their establishment, and of the appreciation of them by the labourers. Mr Jackson related what had been done at Hitcham, where the allotment system was introduced by the late Professor Henslow; Mr Boby told them how the allotments were managed at Wyverstone; Mr Crosse spoke of those which had been carried out on some land of Mr Marriott's, at Stowmarket; and Mr Lambert of what had been done at Mendlesham. The general opinion was that about 20 rods was as much as a man could manage without trenching on the time which belonged to his employer; if he did so, the allotment would be an injury rather than a benefit to him. Mr Hill advocated cottage gardens, but questioned whether an allotment ½-a-mile or more from a man's home was any real benefit to him.

THE LAND LAWS AND THEIR EFFECT UPON AGRICULTURE.

By Mr G. W. Latham.*

THE subject of the Land-laws was essentially one which concerned them as members of the Chamber; it was even more emphatically one which interested them as citizens, as agriculturists; and living, as some of them did, by the receipt of rents and by the profit made after the payment of rents, they were naturally concerned in seeing that the laws which regulated the commodity in which they dealt were fair and just. They might be sure that as on the one hand no landlord had ever permanently profited by an undue increase of rent, so had no tenant ever been better from an unfairly cheap farm. They knew that on the full production of the soil depended the comfort and happiness of the people of the country. If, as was believed by the best authorities on agriculture, the produce of the soil might, by a judicious expenditure of capital, and by improved methods of farming, be raised to double or one-third more than it was at present, they should by that means be pretty independent of foreign corn or of foreign cattle. The increasing masses of ople would be better fed, and in case there would be no fear of famine. He t mean to say that by any legislation ould turn bad farms into good, or that ould protect them against bad seasons variable climate, but he did mean to at one thing wanted in agriculture was capital, and that at present landowners, d of increasing the industry which pro- l such an amount of profit annually, had d it under every possible disadvantage.

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* Read before the Cheshire Chamber of Agriculture.

BSTRUCTIVE AND INSECURE NATURE OF EXISTING LAWS.

the existing laws the investment was insecure as to its tenure, and the tenant to expulsion at the shortest notice. It ade subject to the priority of the land- who had the power to chose and deter- on the solvency of the man he had n as tenant. Only let them give security farmer, cease to make laws favourable few, at the expense of the many, and would find that capital would flow in ut let or hindrance, and limited only by atural laws of supply and demand. At nt the difference between agriculture commerce was that by the first men t to live, and by the second they hoped ow rich. And when interpreted, what his mean, except that it was a concern ich no one cared to invest largely and ut fear, but that farmers were content to a bare livelihood without the smallest of a provision for old age, and no ex- tion of increasing their original invest- ? He wished to bring no arguments st the landlords as a body; the evils he red had grown up gradually, and were retched growth of a feudal system, now xtinct, and of decisions of the law courts on a state of society and on a system ming both long passed away. He felt that if the landowners had, as a rule, ised to the full the powers they had these laws, we should, in this country, been in the same state of agrarian riot e sister country was a few years From that sad consummation, this rance in general of the landlords, the patience of the tenants, and the good sense of both had happily saved us. Still, if they were wise they would not wait to ask for—and their rulers would not wait to grant—the amendment of bad laws until the change was demanded by threats and violence, or until evils which were now only possible came prominently into existence. Speaking of the laws of primogeniture and entail, he said that the effects of the abolition of the first, which was, he believed, certain to be proposed, would be so gradual as hardly to be felt in this generation. As regarded the law of entail, it had much the same effect as the custom of primogeniture. A tenant for life would do very little for the benefit of the land. He could only borrow money under the authority of certain Acts of Parliament, or by life insurance; he could lay not out his money in permanent improvements, such as cottage building, the erection of farmhouses, draining and planting, without giving the whole benefit of his money to the one member of the family who was best provided for, and perhaps to some connexion for whom he had no love. What was wanted was real freedom—freedom of sale, freedom of transfer, freedom of taxation—and to gain this they asked for the prohibition of all those bonds which the system of settlements and entails had woven round them. If all tenures but fee-simple were abolished, he believed that they would have done much to the good of the nation at large, to the owners and their families, to the occupiers, and to the labourers.

HINDRANCES TO THE DEVELOPMENT OF PERMAMENT IMPROVEMENTS.

With regard to the security of the tenant-farmer, so long as the improvements he made were unexhausted, he objected to a lease, because, in the first place, it did not provide for the land being kept in its highest state of fertility; and, secondly, that by it the tenant was bound to the landlord, and the landlord to the tenant for a term, when perhaps it would be more convenient and agreeable for them to part. A man might want to put his capital into some other business, he might hear of a better farm, or the landowner might fairly wish to alter the distribution of his farm; and yet an existing lease bound them together as long as it existed; and if to avoid the inconvenience of this, a man took a farm from year to year, there was no doubt that he was at the mercy of his landlord. He knew that on many estates, notably some in Chester, a lease from year to year was equivalent to a lease for life so long as the tenant conducted himself properly and farmed well; but the misfortune was that the landlord was the sole judge of the tenant's conduct. A dispute with an agent, a few words with a gamekeeper, a slight variance with the parson, a sentence spoken at a public dinner, a vote given in opposition to the landlord, might turn the white sheep into a black one. He believed, however, that one of the greatest hindrances to all permanent improvements had been the legal mxim that so soon as a person fixed up a building pemanently it belonged to the landlord. When, by the passing of the Bill for secret voting, the desire of territorial aggrandizement for political purposes had passed away; when, by the repeal of the Game-laws, the habit of turning good land into a happy hunting ground had ceased; when land was possessed as an investment to produce profit, and not as a luxury for a great man to enjoy, would not the landowners be more inclined to let their land at a rent varying with the price of the produce and liable to be revised at certain intervals? In regard to the Game-laws he was willing to accept, as a remedy for the present evil, that they should be made, as it were, permissive; that in districts where the population was above so many in a certain acreage they should absolutely and entirely cease; and that in districts where the population was scantier, the ratepayers should have the power of deciding whether wild animals should be kept up by artificial laws. He hoped that he should not shock them very much when he said, too, that it seemed to him that the law, by which hounds having found a wild animal on a property had a right to follow it on to another man's land, was entirely incompatible with the thorough cultivation of the soil. Last year he knew of one meet in Cheshire where about 400 horsemen were counted, and generally they saw fields of some 80 and 120. Could they hope to see their clover, their wheat and beans flourish when such a cavalcade had ridden over them?

AGRICULTURAL GRIEVANCES REQUIRING REFORM.

In former days tenant-farmers might have objected to a little affair between two of the fancy coming off in their meadows; but they were expected to submit quietly to the inroads of a large party of gentlemen from the neighbouring towns—not one in ten of whom they had ever heard of before; nor even one in twenty, even if that were any excuse, had land or tenants of his own to be injured. He feared that at no distant time they should have to require that those who wished to destroy wild animals should do it in a country where the wild animals had not first to be preserved at some cost, and then killed at the cost of the loss of valuable food for the nation. There were some smaller grievances upon which he should like to say a few words. These were, the present principle of rating, and the notice to quit at the end of six months, which was utterly insufficient. He believed that what he had asked for—the abolition of the laws of primogeniture and entail, the destruction of the law of Distress, the enactment of a law of tenant-right, the modification of the Game-laws and trespass, and a change in the plan of rating—were what they had a right to demand. They should ask for nothing less, and be content with no compromise. They had been treated as milch cows by the landlords, as patient oxen by the Legislature; they had borne unfair burdens, and they had laboured for other men's profit; but they represented, after all, the great industry of the nation, one of which the income, when capitalized, would amount to £600,000,000 sterling, and if they spoke out boldly and acted fairly there was no doubt that measures on those subjects would be considered and passed on an early day. Even there any power in the country which perpetuate injustice, he believed that were very few who would desire to do The great changes in the country's his- had all been carried by combination and gument, and besides the claims to be hat their importance as an industry gave besides, a righteous strength they gained righteous cause, they had on their side upport of the people, whose interest it that the food should be cheap and ful. They asked for what had been to trades—for freedom; they asked it for their sake as tenant-farmers, and even more for the sake of those who dwelt among them—the labourers. He did not doubt but that they would gain it, and though he looked forward to no sudden or violent change, though he believed that even the alteration of these laws would produce a gradual rather than a sudden effect, yet he trusted the day was not far distant when it might be said of this as it was said of another country in days gone bye, "The pastures are clothed with flocks, the valleys also are covered with corn. They laugh; they sing."

COLONIAL AND FOREIGN AGRICULTURE.

OR the following interesting Returns relating to foreign countries we are in- d to Mr Fonblanque, whose care and n compiling the masses of information he ves, into a readable form, cannot be too y commended. The cultivation of corn, ls us, is extending in Australia. The ge under wheat is generally much in s of the acreage under any other corn except in New Zealand, where oats are principal crop. There was a decrease e acreage under wheat in Tasmania and Zealand in the year ended 31st March as compared with the previous year, more land was used for oats in New Zea- The land now under wheat in the alian colonies must be about 1,240,000 , which, upon an average yield of 25 els per acre in New Zealand, and of 13 els for other parts, would produce about 0,000 bushels, which shews a production of 9 bushels per head of the total popula- of Australia, amounting to 1,917,000 ns.

e wheat crop in Australia is liable to us fluctuations, the yield of wheat in Australia in the two years ended 31st h 1870 and 1871 being estimated at ,000 bushels, or 5¾ bushels per acre, ,961,000 bushels, or 11½ bushels per acre. The difference in the two years might have been even still greater had the harvest of 1871 been very good, but from 2 to 4 bushels of corn per acre are stated to have been shaken out by boisterous weather during harvest time. The wheat crops of South Australia in 1871 are valued at a million and three-quarters sterling. In Victoria, also, the wheat and other corn crops were very deficient in quantity in the year 1870-71. The land under cotton in Queensland is returned at 14,674 acres for the year 1870, which shews but a small increase over the return for the previous year. The acreage under the sugar cane in the same colony amounted to 6341 acres in 1870, against 5165 acres in 1869. The sugar cane is cultivated upon an area not very much smaller in another of the Australian colonies, New South Wales, and also at Natal. Vineyards may be taken as occupying about 16,000 acres upon the continent of Australia, which is equal to the acreage returned as planted with the vine at the Cape of Good Hope in the year 1865, the date of the last return.

The returns relating to the number of livestock in the Australian and other British Colonies are of greater interest in an economical and commercial point of view in England, than those having reference to the cultivation of the soil. The latest information, so far as received, shews a recent increase in the number of horses, cattle, and sheep. In the whole of Australia, including Tasmania and New Zealand, the returns give a total of 797,800 horses, 4713 cattle, 51,294,000 sheep, and 695,000 pigs. From South Australia, it is reported that sheep were slightly reduced in number, owing to the large number used in meat preserving and for boiling down, also by the drought in the far north. The stock of sheep in Australia has, however, been largely augmented during the last few years, and the exports of wool to this country, for the home and foreign markets, has now reached the large quantity of 182,700,000 lb. weight, of the value of £10,800,000 in the English markets.

With respect to the tables of agricultural returns for foreign countries, they have upon this occasion been made to include information for all countries, so far as obtainable, irrespective of the more or less recent date for which it can be given. The table of the acreage of the various crops exhibits considerable variations in the quantity of land used for the several kinds of corn. In round numbers, of the land under corn crops, about one-third is cultivated with wheat or rye in the United Kingdom, against one-half in many of the countries upon the Continent, and considerably more than one half in France and Spain.

Although the acreage under bread corn is so large in many foreign countries, a reference to the table of the estimated average yield per acre, will shew that in some of the countries the probable limit of productiveness has not been reached; such averages as 14 bushels of wheat per acre in Austria, of 17 bushels in France and Prussia, and even of 23 bushels in Spain, indicate that the agriculturists in those countries are not obtaining as much produce as the soil could probably be made to yield. This is generally admitted to be the case also in some parts of the United Kingdom, notwithstanding that the average yield of wheat is estimated at from 28 bushels to 30 bushels per acre. Including all descriptions of corn, the greatest sources of the world's supply are in the east and west, or Russia and the United States. But of wheat alone, France is stated to have produced more than the United States in 1869. The estimated yield of wheat in France in 1869, would furnish a supply of rather more than 7¾ bushels per head of the population. As there are now considerable imports into the United Kingdom of barley from Germany, it may be of interest to state that the estimated yield of that description of corn in Prussia, in 1870, was 76,000,000 bushels. In France, in 1869, the estimated yield of barley was 56,500,000 bushels. The average yield of barley per acre is, however, estimated at only 160 bushels in France, and at 25 bushels in Prussia. The production of barley in the United Kingdom at the higher average yield per acre of from 35 to 40 bushels, must be nearly double what it is in France, upon a larger acreage. The quantity of potatoes grown in Prussia is very large, the produce, in 1870, being estimated at 656,000,000 bushels, or 16,400,000 tons, which is nearly twice the quantity stated to have been grown in France in 1869, and is more than twice the yield of potatoes in the United Kingdom, if estimated at an average of 4 tons or 460 bushels per acre. It is well known, however, that the potato is largely used in Prussia for distillation. The production of beetroot for sugar is specified for several countries. As much as 4,360,000 tons are said to have been grown in France in 1869, and 1,924,000 tons in Austria in 1870. Tobacco, according to the latest returns, is grown to the extent of about 7,000,000 lb. in Holland, 5,000,000 lb. in Belgium, 55,600,000 lb. in France, 4,700,000 in Austria, 3,000,000 lb. in Greece, and 274,000,000 lb. in the United States.

A comparative table of the number of each kind of live stock in the United Kingdom and in foreign countries, closes the series of returns. Russia and the United States, with their vast areas, possess a larger number of live stock, especially horses and cattle, than other countries. With this exception, the United Kingdom stands next to Austria in the er of horses; it follows France and a as regards cattle, and it heads the list the largest number of sheep. The ority of England as regards sheep t, however, be determined by number but the relative weight of meat yielded itish and foreign sheep must also be considered. There can be little doubt of British sheep having the advantage over the generality of foreign sheep in point of meat weight, and therefore they must be allowed something more than the mere advantage in point of numbers in estimating their superiority over foreign sheep.

The Garden.

BEDDING PELARGONIUMS.

FOR general decorative purposes there is nothing more popular among villa gardeners than Bedding Pelargoniums. They find that they come in useful for pot culture in the greenhouse as well as for planting out-of-doors. It is meet that such things should not be forgotten while spring flowers are enamelling the earth with their varied beauty. While the Hawthorns are blossoming and the Daisies springing, and all deciduous plant-life is again clothed, one is too apt to forget to prepare for the coming months, lost in admiration at such a full court of budding splendour. And yet preparatory steps must be taken to enrich the coming months, if we are to keep pace with our neighbours. The gardener has always to think and look ahead, and provide for the future if he expects to reap a full crop of beauty either out-doors or in-doors. The families of plants that supply him with members distinguished for their beauty, and not over difficult to deal with, always have a first place in his estimation. He propagates and encourages the best-favoured of these, until he considers he has selected as many as do the particular service he requires; and so on and on he calculates, and works, and labours, and waits for the return that is to smile upon his untiring efforts.

As we have indicated above, the Pelargonium is a very plastic plant in the hands of the culturist. It can be propagated like a weed at certain seasons of the year: you have only to break a portion of the stem, or cut it off with a knife, and insert it in the ground—if it be of a sandy nature all the better—and it will grow almost as fast as a Willow. Only, unlike a Willow, the cutting will not strike root inverted, but you may allow it to be fully exposed to the sun, and its leaves, although flaccid and drooping for two or three weeks, will get distended by the new sap that is infused, and the wounded section will heal over—callus as gardeners call it—and, in time, roots will be propagated, and an independent life thoroughly established. It can be cultivated, too, without much of the mysteries of the fraternity being called into exercise; pot it in any ordinary soil, and it will rapidly extend. The only caution needed is not to give it too much root space if it is to be grown in a pot for the greenhouse. If this were done, instead of yielding a full crop of flowers it would send up leaves like miniature Coltsfoot, and the flowers would not only not be so plentiful, but they would not be so generally perfect. A limited root run is one of the first requisites to insure a rich inflorescence.

Many, indeed, instead of planting out their Pelargoniums as they would do their Verbenas, plunge out the pots, and, as a reward, they have better bloomed beds. This, however, is only necessary where rainfall is great, and sunlight impeded with corresponding rain-clouds. When summers are usually bright, and rainfall moderate, no such precaution as keeping the Pelargoniums in their store or stock pots is necessary. It is the best plan, generally, to turn the plants out of the pots, as they can better cope with fluctuations of drought, sending, as they do, roots down beyond the drought influence, in search of moisture. A shrubby-foliaged Pelargonium, notwithstanding its many trusses of flower, is at best but a starved-looking pauper object. If they are to be planted in beds, do not overfeed with manure. A sunny exposure and moderately enriched earth will meet all the requirements necessary for bedding Pelargoniums.

are to be grown in pots for the con- or greenhouse, or any similar place, ve already said, under-potting should ule. Some prefer growing plants kind into large sized specimens; doing so they have to treat erally in the way of root accom- , until the size desired is obtained. ep pinching the growing shoots with er and thumb, merely picking out the eye. This operation induces the plants or send forth laterals more nume- n would otherwise be the case; but f the extension being vertical, as it e were Nature left to perfect its is lateral-wise. Not contented with t, the grower ties down these laterals t a horizontal position, and forms the the specimen in this wise. This is well for shewing horticultural skill in on and training, but plants of a much ited size are more generally useful. e plants have attained that size, they, e to be in a measure cooped up in parison) smallish pots. The untu- ower will therefore guess that it is fficult matter to get at the culture of iums, and he may be fairly in- to try his 'prentice hand in their ment.

e more important item to deal with perly be considered the selection and ination of the most eligible varieties. illings will not be begrudged by any o takes to their cultivation for the of additional forms that have quality, size of truss, and size of bloom to re- d them. We give the following sixteen g the best of the new and old bed- largoniums. Many of them are equally —some of them more so—for growing lass, so that no interested party need in trying them for either purpose.

.—One of the most perfect salmon- scarlet flowers we have ever seen, of ubstance. As the flower increases in hades out towards the extremity to a colour, and is scarcely so perfect. age is stiff, round, and having a dis- e on its surface.

Christine.—Still one of the best pink bedding Pelargoniums offered in commerce; first-rate habit, prolific in flower trusses, and the flowers standing well above the foliage.

Christine Nosegay.—This is a much larger trusser than the one above described, very much like it in colour, but the heads so very large, as exhibited before the Royal Horticultural Society, as not to have been inaptly compared to Hydrangea. The habit is first-rate; it grows free, shooting out to make largish specimen plants in the flower border by the month of September. Really one of the first and best we would nominate of the rosy pink class.

Crimson Nosegay.—This is a distinct and telling variety, grows stronger and looser than Christine, but, withal, a good habit, a little delicate when first planted out. Its leaves are of a peculiar tone of green, and its flower scapes are whitish, sometimes marbled. The flowers are of the most brilliant crimson, and the truss, although not so large as many, well filled up. It has not the objection of many of the large-headed kinds in having spent dead flowers stalking up among the living beauties. Altogether, it is one of the most novel and effective of bedding Pelargoniums.

Blue Bell.—This is well worthy of taking in, because of the novelty of its colour. It is somewhat of the hue after which it has been characterized—of a bluish shade. It gets intensified as the flowers get older. It has a good habit, a free disposition to flower, and the leaves are densely set upon the stems.

Eclat.—This is one of the very large trussing varieties that may be brought to admirable perfection under glass. The colours of the flowers, however, are more intense under sunlight, and its merits generally are such as to command for it a leading position out-of-doors. It is of the richest shade of crimson purple, its flowers stand clear up over the foliage, and the effect of a well-cultivated plant is such as must please every observer. Its foliage is good and distinct, having a defined zone.

Fire King.—This has been first-certificated by the Floral Committee, and it is well deserving of the honour. It is incomparably one of the brightest-glowing crimson-hued sorts of the section, and when exposed to weather, without being pelted with rains, it is a Fire King in reality. Those who have seen it most speak of it best. We had an idea that the immense trusses which it bears would be open to the insuperable obstacle of shewing dead flowers in their globular outline, but it seems to have a persistency beating many rivals. The habit of the plant is vigorous, and its leaves are marked with a narrow zone.

Lord Derby.—This is one of the familiar names to Pelargonium growers, as well as to the political public generally. It is an admirable sort, splendid for pot culture, and good for bedding purposes. The flowers are large, of great substance, and as perfect as if each had been subject to artificial modelling. Take this, together with the glowing orange-scarlet tint, and you have a variety that may be equalled in form, but certainly not surpassed.

Masterpiece still keeps in the front rank, and when better known is likely to be the first of the class in the lists of all gardeners. It has a model habit, in respect of the way in which its branches are clothed with leaves, and it is not a shy grower. The foliage stands flat, at right angles with the stems, and is zoned. The flowers are set on the extremity of a foot-stalk, strong enough to carry them without support, and they are literally studded into a globular head, which remains good for a very long time. The colour is salmon, with a broad central belting of crimson; and the young blooms being tipped with the crimson glow, render this one of the most striking and novel Pelargoniums ever raised.

Our Future King.—This is considered by many to be better than Lord Derby. It is not better as an individual flower; but it is so in habit, in size of truss, and probably in colour of bloom. It, too, will be a very fine sort for growing in pots in the greenhouse.

Robin Hood.—This is a decidedly distinct, and must be a popular bedding Pelargonium. Its habit is denser, freer; and its flower stems raised well above the foliage, give its trusses of flowers all the more nobility. The colour is striking, the upper petals being of a vivid crimson, and the lower ones more of a shaded purple.

Sir Fitzroy Kelly.—This was one of our favourites last year in the conservatory, and promises to be worth something for out-door culture. The habit is most desirable. Its branches are densely clad with leaves, and it shews a great disposition to extend itself by numerous laterals. The leaves have a good formation, roundish or reniform, and the dark zone on the green ground enhance the setting of the floral trusses. It is somewhat of the scarlet hue of an old favourite of ours, called General Simpson: the trusses are moderately large, and the stems in properly cultivated plants, about the average number of the well-known sorts.

Thomas Moore.—This is considered to be the most promising bedding Pelargonium yet known. The habit of the plant is such as to commend it for bedding purposes, and the prolificness of the flower stems entitle it to eulogy. It is not large in the individual truss —indeed, one of the smallest in that respect we know of, but they are so numerous as to present at all times a good crown. When they fade, others rapidly take their place. It is one of the sorts that come early into flower, and stays late—a valuable feature in a bedding plant of any kind. Although small in the truss, it is not small in the flower, neither is the flower flimsy or imperfect. It has capital texture, and the form is as perfect in its way as Lord Derby. The segments overlap one another, so as to form a perfect circle, and the colour is a brilliant scarlet, relieved, as many of the scarlets are, with a white eye. A compact habit, a medium stature, and a prolificacy of scarlet flowers, are items of no small value in a bedding Pelargonium.

Robert K. Bowley.—Any one who looks up the "Floral Magazine" will be acquainted with the form, and have some idea of the character of this variety. It has received first honours from the Royal Horticultural, d it stands well the criticism of the grower. is one of the foremost of the nosegay ssers, and carries its flowers well over its iage. The leaves are dark green, and are rked with a zone of a darker hue. It is shrubby sort of grower, and is prolific of wer-stalks. The flowers themselves are of clear glossy crimson. It promises to do ell either out-of-doors or in-doors.

Rose Rendatler.—No one who has grown elargoniums but knows this now old favour- . It is excellent for greenhouse culture, ther in a small-sized or large-sized way. For hibition purposes, it still stands at the ad of the list of its colour. No one n yet beat it out of court for prolific oom; and the trusses are of such size, and nerally, when under glass, of such quality to be without a flaw. It is of a shaded lmon and rose colour, and is worthy still of e first place in collections.

William Underwood.—This was one of the best of the Chiswick lot of last year, and wins golden opinions upon its quality of remaining long in bloom. It is dense and compact, throwing trusses of nearly similar altitude, the flowers themselves being of that tone of orange scarlet which pervades many of the sorts offered for sale; still, this is one of the selected and best. It, too, has the character of being an excellent winter bloomer, which is a point of great consequence. We want Pelargonium flowers during November, and December, and January, if we can get them, for cutting from for bouquet purposes; as nothing is better as an item for making up a fine bouquet than a few trusses of Pelargoniums.

With this list, growers generally may consider themselves in the possession of the most distinct and best sorts offered in the market.

HERBACEOUS AND ALPINE PLANTS.

MY object in publishing a series of articles treating in general terms on e above subject, is to call more attention these long-neglected, imperfectly-known, autiful, and singularly interesting races of ants—none the more to be neglected be- use some of them may be natives of our n favoured land, growing wild on our gged hills or lovely dales, and the pride of e past generation. Unfortunately, many our rarest, loveliest, and most interesting ecies are gradually but surely becoming t to cultivation, as well in the homely ckery and flower-plot of the old-fashioned rden, as in their habitat or native station. ere are several of our native plants which ve only been found in one or two, and obably widely distant localities in the itish Isles; and to deprive that station of e last remnant of any plant, deserves, to thinking, grave censure.

> O ruthless hand! that strips the earth
> Of flowers that bloomed before thy birth,

Our native plants are far too much neglected in our gardens, and it is desirable to shew that many indigenous plants are more beautiful than our amateurs and gardeners suppose them to be. A selection of the most noteworthy will be included in the following list, which, however, will consist, in great part, of hardy foreign species. I hope, ere long, to see a return to the mixed border system of ornamentation. Appropriate places are to be found in most gardens for a miscellaneous lot of border flowers, which would tend to relieve or revivify the decidedly monotonous and gaudy parterres of modern flower gardens.

I doubt not that ere many years are past, the finer hardy plants will make a display in British gardens, which will far surpass that of the olden days, in consequence of the increased facilities for exploring foreign countries.

Thanks to the Messrs Backhouse of York, Ware of Tottenham, Henderson of St John's

Wood, Parker of Tooting, &c., something has already been done in order to revive the taste for these plants, by the introduction of many valuable species during the last few years.

Previous to the almost universal system of bedding-out, which one sees everywhere, the mode of decoration was that of the rock and mixed-border system, to which I was first educated, and can, consequently, never be forgotten. My father, who had risen from a garden labourer to the position of head-gardener to a noble family, knew no other system, and there can be no doubt of its claims even at this day. The principal herbaceous border at this place was arranged on either side of a long walk, which connected the pleasure-grounds with the glass department. At the extremity of this walk, and immediately opposite the glass erections, a rockery branched right and left, 5 to 6 feet high: anything higher might have been detrimental to the fruit tree border immediately opposite. The mixed borders, which were filled almost with herbaceous and alpine plants, were arranged strictly in accordance with the view of keeping the dwarfer plants in front and the taller at the back—these were backed by a Rose hedge. The following also were arranged in parallel lines :— Dahlias, Hollyhocks, Sweet Peas, Scarlet Runner Beans, and last, but not the least effective, a row of standard Apple trees. The spaces where early bulbous and tuberous-rooted plants had bloomed and gone to rest, were carefully soiled over and sown with annuals, or planted with half-hardy bedding plants—such as Verbenas, Petunias, &c. Those borders always yielded a continuance of interest and beauty throughout the year. It is a system which to do well requires a knowledge of the plants, so as to select the best kinds only. The old mixed borders were, as a rule, doubtless often disfigured by the presence of many coarse plants, and often so badly arranged that their culture became unpopular. Once plant a weedy Symphytum or a strong coarse-growing Aster, like many other weedy subjects in Nature, it will not only take good care of itself, but, if not closely watched, will ultimately exterminate its neighbours. This must be avoided. Half the success depends upon the selection, which, if judicious and well arranged, will produce a better and more satisfactory result than the present fashionable half-hardy plants can ever produce in villa gardens. Advocates of gaudy-coloured parterres might have some ground on which to base their arguments if we lived in a climate in which vegetation was nearly extinguished in winter; but when we consider that our climate is capable of growing to perfection hundreds of beautiful plants from all parts of the world, the tide must turn in their favour—the taste for depending on a few tender plants of bright colours has passed its climax. It may indeed be doubted if the carpet-coloured parterres could have held ground so long, had it not been for a few curious succulents and other expensive tender plants which came to the rescue. On the one hand, we have a class of plants which perish with the first frost of autumn, consequently, must be annually purchased or annually preserved with appliances more or less costly; on the other hand, subjects which, when once planted, increase themselves, are quite at home in the open ground, and no matter what the winter may prove, the grower is not disturbed by visions of fires having gone out, or mats blown off and frozen plants, which is often the case in many places where scores of yards of house or pit accommodation are provided and heated, at great expense, to carry out the system of ribbon and parterre gardening.

I do not for a moment mean to imply that the half-hardy bedding system should be entirely abandoned. There is no reason why we should not enjoy our tender summer flowers to a certain extent, but let us have the hardy ones at the same time. Scores of our hardy plants might be incorporated in the flower plots with the bedding-out plants, and *vice versa*, with much advantage to both. A great number of our dwarf Alpines accommodate themselves thoroughly on good loamy soil in the open border, and, consequently, are calculated to bring within the range of every garden, a large and varied amount of

The number of hardy species known under the above heading may be termed legion, and it would be rash to say that one-half of them are worthy of cultivation; consequently some of the most beautiful and interesting, decoratively and botanically, will be noticed, and will serve as a guide to the beginner in his selection for some time to come, and by which time a second list may be forthcoming of species which are still scarce in the hands of a few.

The species which I propose to enumerate in this list will be taken in alphabetical order. First is the noble genus Acanthus (Bear's breech). A. mollis, and A. candelabra, are the only two species worthy of a place in this list, the former is a fine old plant of large foliage and distinct habit; the latter a plant of modern introduction, and a great acquisition to our list of hardy plants with ornamental foliage. Both these might be used with advantage in these days of "sub-tropical gardening," and would certainly furnish as good an effect as some of the tender plants we occasionally see used for that purpose. Acanthus means a thorn, some of the species being spiny or having thorns, which is an objection in decorative plants. The two species here mentioned are known as smooth Acanthuses, natives of southern Europe—flower spikes 3 to 4 feet long in good ground, flowers white, from the middle to the top of the spike. They may be increased either by seed or division of the roots. The seed may be sown in a light, dry soil, about the end of March, in the open ground, and if the season is favourable, will be ready for thinning in May, leaving the seedlings about 6 inches asunder, which will be room enough until autumn, when they should be transplanted to a permanent position. If they are to be propagated by the root, spring is the best time. Being deep-rooting plants they do not succeed so well moved in autumn, particularly if the following winter should prove wet and cold. When once established in good, well-drained soil, they are difficult to eradicate, but they are very impatient of wet soil.—*Robert Bullen.*

[To be continued.]

Arboriculture.

YEWS FOR VILLA GARDENS.

NO plants are so useful for planting in villa gardens, or even those of larger extent, as Yews. Retinosporas have come in to do a share, and capital units, as colour and variety gains, they are; only we are a little doubtful as to how they will succeed over the varied surface of Britain. We are in no doubt, however, about our Common and our Irish Yews, and their varieties. They are so generally useful that they are employed everywhere, and in every conceivable way, as under-furnishing for shrubberies and plantations; again, as hedge plants for fencing some object out of sight, or making a marginal effect line, or again for individuals about villa gardens, about parks, about the geometrical flower garden; and indispensable for winter gardening, when that is carried out. The columnar form of the Irish Yew strikes every passer-by, and the Common Yew may be so trimmed that it can be made to do service in a variety of ways. Both the English and the Irish species are made available for grafting, or working the golden forms to present a standard-like appearance; and most capital stocks they make for raising the heads of the low flat-spreading Taxus adpressa, and the weeping elegant-habited T. Dovastoni. Nothing, indeed, is more admirable, in the low miniature tree-like vegetation, than these Yews worked one on another. We can merely name the sorts that specially claim the attention of the numerous readers of this magazine.

The common English Yew (Taxus baccata) is one of the most suitable memorial trees that any race could employ. Whether we look to the sombre tone of the foliage, or the wonderful length of life through which the plant endures (some say it may exist 2000 years), no more worthy object could be selected for the grounds in juxtaposition with cemeteries, mausoleums, and such like. It does not grow to a great height, not above 40 feet; but it spreads laterally to a considerable circumference. It had been used for the too formal decoration employed and inaugurated by the Dutch in their style of geometric gardening; but as taste improved, it took a decided stand against what must now be looked upon as puerile imitation. It were well enough to trim the outline to assume somewhat of a symmetrical form; but beyond that is questionable taste.

The Golden Yew (T. baccata aurea) is a sport from the normal form, and is beautiful in colour; only, like most variegated sports, a little dwarfish in growth. Worked on the green variety, it makes a grand object, which must be seen to be thoroughly appreciated.

The Irish Yew (T. baccata fastigiata) is so well known that we have only to name it. The way in which it has been employed in recent years as a stock for the Golden Yew, adds greatly to its attractions. It is one of the best, so worked, that could be employed for the flower garden, as an object plant, either for summer or winter, and is, as it ought to be, more and more used in that way.

The Weeping Yew (T. baccata Dovastoni) is also a great gain in varieties, from the elegant habit which it assumes, and the spray-like character of its branches.

Then there is the Yellow-berried Yew (T. baccata fructu-luteo), which cannot be distinguished from the common sort unless from its yellow berries.

There is also the erect, almost conical, form v (T. baccata erecta), which needs trimming with the knife. It grows rect than any of the others, the Irish ed ; but is like the common sort in ther respect.

re are many other varieties of the cata order, all more or less interesting. rms we like best are Dovastoni aurea legantissima—another of the golden-sorts, as fine, in its way, as the beauti-anese Thuja elegantissima.

us adpressa is a dwarf dark-green-leaved , which seems to be as hardy as the n, notwithstanding the difference of habitat. Worked plants of this do ully, and come in as valuable helps to ociate plants, for flower-garden deco- Like the others, it can be so trimmed ssume any form. Moreover, by graft-on tall standards we can have the n character at once, as is exemplified fine specimen in the grounds of Mr n, Falkirk, N.B. We should like, how-o see it in the easy form that Nature t, assisted by the working process of it so high as to be more within eye reach, and in so much the more desirable and effective.

Taxus japonica is another novelty of a fastigiate character, something like the Irish Yew, but dwarfer in stature, and with leaves densely set upon the branches. It is likely to be much sought after, when better known, as a plant for winter gardening.

Cephalotaxus Fortunei is a very distinct form of Taxad, with prominent leaves, rather widely set apart. It is not much grown, but is very useful for its distinctness where a collection is formed. It is also a good winter garden plant. The male is the more free-growing of the two ; the female being hampered with the additional weight of the cones, and the furnishing for the food supply. It will do well in selected spots where other Japanese plants are grouped.

The Maiden Hair Salisburia (Salisburia adiantifolia) we commend to all planters for effect, from its singular appearance when it attains tree size, and at any time of its life for its beautifully formed leaves. It is conical in youth, but grows into spreading habit as it gets older.—*Practical Gardener.*

CONIFEROUS PLANTS FROM BRITISH COLUMBIA.*

the Cupressus tribe several interesting species were received from Jeffrey, veral names have to be corrected. drus decurrens, which may be ranked t his best introductions, was sent out association under the name of Thuja a, in compliment to Sir Wm. G. Craig, f Riccarton (an arboricultural ama-high standing), and I find it is still ely cultivated under that name. This drus grows to the height of 40 feet, stem 9 feet in circumference. It grown in deep rich loam, in a some-eltered situation, as it is very liable estroyed when fully exposed to the It propagates freely by cuttings, and makes excellent plants, but it takes time to do so. Instead of forming roots at once, a rounded ball, about the size of a hazel-nut, is often produced at the extremity. If the cuttings are lifted, and portions of the outer skin of this small brown swelling cut off, roots will soon be given out from the edges of the cut extremities. Without this manipulation the cuttings will lie a long time in the ground in a fresh condition with no appearance of growing. The Libocedrus is likely to form a noble plant for the warmer districts of England and Ireland. One standing on the lawn in the Worcester nursery is 18 feet high, with a stem 2 feet 6 inches in circumference at base. The tallest specimen in the Edinburgh garden is 14 feet, and the habit is quite that of the Irish Yew. Grafted plants

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nued from page 332.

were sent from the Continent some years ago, and named L. decurrens divaricata. When first received, the branches had a peculiar diverging aspect, probably owing to their free growing nature, on account of being grafted. Such plants are now quite as upright as any of the original seedlings.

A Thuja, raised from seed, and which has turned out to be the true Thuja gigantea, is another acquisition, first sent home by Jeffrey. When raised, the seedlings had much the appearance of Thuja occidentalis, and little attention for a time was paid to it. After a few years it began to assume an upright habitat and has gone on rapidly increasing. The largest specimen is 20 feet high, and 18 feet in circumference of branches. Numerous plants introduced by other collectors, under the name of Thuja Lobbii, T. Menziesii, and T. Craigana, appear only to be varieties of T. gigantea, and although not as yet taking the rapid upright habit of this tree, they are very closely allied to it. This tall species of Thuja is perfectly hardy, and readily increased by cuttings. From its peculiar upright habit, and standing the wind well, it will form a great acquisition to pleasure grounds; and as the timber of it is said to be good in quality, it may some day or other be grown for forest purposes. Although the habit of the plant is that of an upright growing shrub, it will lose its lower branches like the ordinary evergreen coniferæ when growing close together.

Another Thuja was raised from Jeffrey's seeds by Messrs Backhouse & Son, of York. This plant has a very distinct habit of growth, resembling in some respects the Thuja gigantea. It puts up a strong loose branching leader, having all the side branches more or less pendent, the points of all turning upwards, and each of the lower ones assuming the appearance of a leader. This variety was sent out by Messrs Backhouse under the name of Thuja Craigana, as it happened to come up in the pot in which the Libocedrus decurrens seed (then called T. Craigana) was sown. This peculiar variety is now extensively cultivated under the name of T. Craigana. It is readily propagated by cuttings, and is easily distinguished in habit from all other species of Thuja. The largest plant growing here is 15 feet high.

A most interesting tree of this section I must not omit to record, is the Cupressus Lawsoniana. Although Jeffrey had not the credit of introducing the seed of this very beautiful tree, he certainly deserves the credit of discovering it. I stated at the commencement of this paper that after the death of Jeffrey, all his effects that could be procured were sent home to the Association, including a large number of dried plants, amongst which were found several sheets of carefully dried specimens of what is now called Cupressus Lawsoniana, in excellent preservation. Judging from the quantity and the trouble taken to dry them, it must have been looked upon by Jeffrey as a plant worthy of being introduced. No seeds, however, were found. The specimens must have been collected fully a twelvemonth before any seeds of the plant were sent to this country. The first importation of the seeds was in the autumn of 1855, and the plant was then named Cupressus Lawsoniana.

Of the genus Pinus, Jeffrey was successful in introducing some new and interesting species. Perhaps the finest of all is the Pinus Jeffreyi, which was named and figured by the Oregon Association in compliment to its discoverer. The P. Jeffreyi is stated to grow to the height of 150 feet, with stems 12 feet in circumference. In this country its habit of growth approaches that of P. Laricio, and, like it, the whorls of branches are proportionate to the age of the tree. This tree has a peculiar whitish green colour and has been very extensively introduced into many nursery establishments, and ought to be planted in forest groups by some of our enthusiastic arboricultural proprietors. The largest specimen in the Botanic Garden is now 19 feet high. It was introduced in 1853, and has seventeen whorls or branches.

P. Balfouriana is another new and remarkable growing pine. In its native condition, it grows to the height of 80 feet with a stem 9 feet in circumference. In this part of the country it seems inclined to be dwarf. It retains a leader, and regular side branches.

he leaves are arranged round the branches xactly like bottle brushes. Although introluced during 1852, the tree in the garden ere, notwithstanding its symmetrical shape, is carcely 3 feet in height. In peaty soil, and n a more southern climate, I have no hesiation in saying that the result would be diferent. Very few seedlings must have been aised, as few of the original plants are to be net with. Grafted ones only are to be had in nursery establishments.

Pinus flexilis is another of Jeffrey's introductions. It is a diminutive tree, growing in its native habitat to the height of 40 feet, with stems 3 feet in circumference. Being a mountain pine, it is inclined in this country to assume more the appearance of a large shrub than a tree. Like the P. Balfouriana, it is very rare in collections, and, like it, few seeds must have been raised. Grafted plants under this name are to be had in nursery establishments, some of them however totally different from the original P. flexilis sent home by Jeffrey.

Pinus Murrayana is another of Jeffrey's introductions. Of this tree the seeds must have been mixed, as two distinct varieties came up. The one having an upright growth and of a beautiful light green colour. The other of a scrubby habit and dark green, very different from what Jeffrey describes it, viz., a conical growing tree. One of the finest specimens of the upright variety that I have seen, is growing at Borthwick Hall, near Edinburgh, the seat of Charles Lawson, Esq.

Jeffrey also sent home seeds which he called Pinus tuberculata. This is a very interesting tree, having a large globular head of a light green colour, and very hardy. In this respect it is very different from the plants previously cultivated under that name, and originally sent out by a London nurseryman. These plants had more of a tree growth, with thicker leaves of a dark green colour. The latter were entirely destroyed here during the winter of 1860-61, while Jeffrey's stood uninjured on the same piece of ground. Besides the foregoing species of Pinus, Jeffrey also sent home seeds and cones of several kinds previously introduced, such as P. Lambertiana, P. monticola, P. Benthamiana, P. ponderosa, P. Sabiniana, and P. Coulteri.

Jeffrey's seeds were divided into 281 shares, and sent to subscribers all over Europe, and even to America. Other species of conifers than those here noticed may have been raised, the owners probably imagining that they must have been grown by other parties as well as themselves.

Besides conifers, Jeffrey also introduced many deciduous trees, shrubs, and herbaceous plants. My object has been to confine my remarks particularly to the coniferous section, but a very few of the others may be noticed. Many sent home by Jeffrey had been introduced, while others were known only by name, but had not been previously sent home. One of the latter is Nutallia cerasiformis, a shrub belonging to the Rose tribe. This plant ranks amongst the earliest leafing shrubs now cultivated in the open garden. The flowers are in racemes not unlike the white variety of the Ribes sanguineum. Although the Nutallia flowers freely in the open border, it is wonderfully improved in appearance when grown against a wall. Among the numerous herbaceous plants sent home, those really new which have come under my observation are the Dodecatheon Jeffreyii and Pentstemon Jeffreyii.

As the first expedition to the territory of British Columbia turned out for many of its promoters rather a prosperous undertaking, it induced several of its most enthusiastic members to re-organize another expedition for the further exploration of these coniferous regions. After several preliminary meetings, it was ultimately arranged to send out another collector, and Mr Robert Brown (a native of Caithness), an enthusiastic botanist, and thoroughly devoted to the various branches of natural history, was selected to undertake this second expedition. Many of the original subscribers at once came forward to assist in furthering the objects of the association. After Mr Brown was fitted out with all the requisites necessary for the journey, he left Britain in the month of March 1863, and was absent for nearly four years. This second mission, however, was by no means so profitable to its promoters as the first, as seeds of comparatively few new plants were introduced. Judging from the dried specimens sent home by Mr Brown, many good trees, shrubs, and herbaceous plants must have been seen, and although many seeds of interesting species were collected, unfortunately very few of them reached this country in a state fit for germination. Of conifers (the collection of which was one of the chief objects of the mission), comparatively few were received. Those, however, which succeeded in the garden here, I shall now enumerate.

Of the genus Pinus, seeds of the true P. Murrayana of Jeffrey came up freely, being readily distinguished by the green colour of the leaves and beautiful upright habit of growth. A long list of interesting species of the genus Pinus, and other new deciduous trees and shrubs, observed by Mr Brown, have been published by him at various times in different periodicals, both in this country and America.

Of the genus Picea, one kind only came up, named P. grandis. This plant is evidently one of the forms previously introduced as P. lasiocarpa, certainly not the true P. grandis of Douglas.

Of the genus Abies, seeds of several kinds were received, and two sent home as new, and provisionally named by the association—one, Abies Parryana, and the other, A. Hanburyana. The former has turned out to be identical with the Abies Pattoniana first introduced by Jeffrey, while the A. Hanburyana seems to be nearly allied. Its leaves, however, are longer, broader, and somewhat undulated.

Some seeds of Abies Douglasii were sent home by Mr Brown. They soon grew, but have a light-green colour, and much covered with resinous blisters in the young state, like those raised from Jeffrey's importations, having a habit almost identical with the early plants raised from British ripened seed, certainly very different in colour from those sent home by Drummond during the Franklin expedition, or by the ill-fated David Douglas during 1826. I feel convinced that there is a variety of the A. Douglasii yet to be sent from the Rocky Mountain district, infinitely superior to the generality of A. Douglasii seedlings received during recent years, having dark evergreen leaves, perfectly hardy, very upright in growth, and admirably adapted for forest purposes. Those sent home by Drummond are of this character. Some plants sent out by nurserymen under the name of A. Douglasii taxifolia may be this variety, but certainly not all, as some varieties cultivated under this name are rather tender, and have more or less of a drooping habit.

In Britain we have numerous medium sized trees of Scots fir, growing on the outskirts of forests, from which cones can be procured in abundance. I attribute the sickly state of many of these seedling trees which have got into cultivation, to the collectors sent in search of seeds being paid by the bushel. If the requisite quantity can be procured from such medium sized trees, it is scarcely to be expected that any one will take the trouble of procuring cones from lofty trees.

In the selection of seeds for forest purposes, too much attention cannot be paid to a vigorous state of the trees in this country, from which seeds are to be procured for supplying the demands of nurserymen. The same care is also requisite in the selection of trees in foreign lands from which to procure seeds, although, at first only intended for ornamental purposes, as the day may not be far distant when seeds of some of these trees may be required for forest growth. If taken from sickly trees at first, they may undeservedly receive an inferior character, which might have proved otherwise if they had been taken from tall and healthy specimens, although the cones should be scarce and more difficult to procure.

There is a circumstance to which seed collectors pay very little attention, but which calls for careful observation. I have just stated that seeds were not unfrequently procured from medium sized trees growing along the outskirts of pine forests. In such situations it is often impossible to depend on the progeny. The pollen of most coniferous trees produced in very large quantities, and is ften blown about to a considerable distance. o this cause I attribute the sickly condition f the plants raised from much of our homeipened seed, as is observable in Abies Menziesii, A. Douglasii, Picea nobilis, Pinus Monticela, P. Laricio, and others. Such xamples prove the necessity of foreign seed ollectors penetrating the pine forests in order o procure seeds in a pure and perfect state. The rarer species of conifers now cultivated in this country are not yet to be had in such quantities as to be grown in a forest condition. The chances, therefore, of impure seed are very great.

A circumstance connected with the early oning of certain recently introduced conifers into this country, deserves investigation. On inquiry, it will be found that early coning ay be attributed to several causes. For any years the newer conifers were generally rown in pots perhaps for a much longer time an they ought to have been, and when lanted out the roots were often matted toether, rendering it often impossible to extriate them without injuring the plants. Such pecimens were generally planted with their alls of adherent earth entire. For several ears these trees get on well, but in time icken from a strangulation of their roots, hich results in early coning. Another mode f bringing young trees into a coning condiion, is the tying the stems upright, which appen to be leaning to one side, from ind or other causes. The tying which some f these plants are often subjected to, and e after neglect of taking off ligaments used, as a tendency to cut into the bark on one ide, and often weakens the top, which results n early coning. Another cause is from translanting, and is particularly noticeable in plants f the Picea nobilis. Although transplanting is ften done for this express purpose, I have y doubts if the progeny of such trees can e relied on for producing permanent healthy lants. I am inclined to think that all these remature methods of inducing cones will roduce a sickly progeny. It will be a ervice if those individuals who have had exerience in seedlings thusproduced, will kindly give the results of their experience; it would confer a favour on many cultivators, by saving the extensive planting of trees that will not ultimately succeed. The sickly state of many of our young larch plantations, I much fear, is owing to carelessness in seed collecting.

Of the genus Thuja a considerable quantity of seeds were sent home by Mr Brown, under the name of Thuja Craigana. These have the appearance of Thuja gigantea sent home by Jeffrey, or the varieties sent by other collectors under the names of Thuja Lobbii and T. Menziesii.

The varieties of Thuja received at different times from British Columbia are numerous, and from the slight difference observable in them, I am inclined to think that the seeds must have been collected from trees growing on different soils and situations.

Of the genus Juniperus, several very interesting species are to be seen amongst the dried specimens received from Mr Brown. Several packets of Juniperus seed were also sent home. The only one named by him was Juniperus Henryana, of which two distinct varieties have come up, and are now in cultivation. As the true plant has not been described, it is difficult to know which was originally intended to bear that name.

Seeds of deciduous trees, shrubs, and herbaceous plants were also distributed; of the former, Prunus Pattoniana appears to be distinct, although more of a shrub than of tree growth. Mahonia Balfouriana seems to be identical with Mahonia aquifolium, introduced from California in 1824. A species sent without a name has turned out to be Spiræa ariæfolia, a species long known in the British gardens. Perhaps one of the most useful introductions by Mr Brown was the Bunch grass (Elymus condensatus). This grass is without exception one of the earliest we have in Britain, the leaves can be cut about 24 inches long at the beginning of March, while this year it was nearly 30 inches, and before the end of September the plants measure from 8 to 9 feet in height. Although introduced during 1864, it does not appear to be receiving that attention which I think it justly deserves. This grass should be thoroughly analyzed by competent parties, and its merits given to the public. It seeds abundantly in this country, and if found to possess sufficient nutritive qualities it could be readily increased; seeds of several pasture grasses were also received and grew freely, but I have not heard of any good that has resulted from them. Besides grasses, seeds of many herbaceous plants were also distributed. The packets being small, the distribution was limited. If anything new has been raised from these seeds, it has not been communicated to the association.

Mr Brown's mission ended in the autumn of 1866. Looking through the dried specimens sent home by Jeffrey and Brown, as well as the introductions of Douglas, there appears yet to be ample scope in North-West America for a collector to go over the same ground again. The original habitats of Picea amabilis and P. grandis of Douglas do not appear to have been touched upon by any other party, as no true seeds of these two species have again been procured. I stated in a former part of this paper, that seeds were received by recent collectors under the above names, but turned out to be other species. If the true species have been sent, none of them have germinated. The Pinus Balfouriana and the true P. flexilis have only been sent home by Jeffrey; and the Abies Hanburyana and Juniperus Henryana only, by Brown. Judging from the dried specimens received from the various collectors, interesting specimens of Pinus, Picea, Abies, Thuja, and Juniperus, have yet to be introduced. In these extensive and comparatively unexplored regions, a variety of soils and situations must be met with, particularly adapted for certain species of conifers. Suitable spots, as damp, dry, loamy, or peaty, favourable to the growth of certain plants, are frequently very limited in extent. A collector may therefore pass within a few hundred yards of some rare species and never see them. From these regions a vast amount of novelties have yet to be procured, and such as would reward any young and enterprising collector.

The Veterinarian.

SCRATCHINGS IN HORSES.

take the following remarks on this subject from the *Toronto Globe*:—

es or cracked heels in horses may superficial excoriations, or in deep- ores of an indolent and ulcerous ; they result from slight inflamma- up in the skin and the sebaceous hich are very numerous in that part imb, and when once the skin is he motion of the limb aggravates se.

s with coarse hair, and legs that endency to swell when standing in e for a few hours, may be said to be sed to scratches; but the exciting e want of regular exercise, exposure and wet, or wetting or washing the d not drying them properly imme- fterwards, a common cause in the spring months, when the roads are muddy, and the clay and slush o the limbs. Where horses are al- stand in the stable after coming rk with their legs in the condition d, the heels are irritated, and ex- sores soon appear. A very slight the heel from any cause may give very severe case of scratches.

es, although a very common disease horses, with a little care and atten- ht be prevented. When a number of re so attacked in one stable, the ent must be faulty in some par- A slight case of scratches frequently a very serious disease from the ap- of irritant dressings, as from using the oils that are recommended to ything; but instead of allaying the they excite inflammatory action, not only confined to the heel, but p the limbs.

In the general treatment of scratches, when the case is severe, the hair of the heels, if long, should be carefully cut off, and the parts well washed with tepid water, and afterwards thoroughly dried with a soft cloth. To further allay the irritation, a poultice of linseed meal, or of boiled turnips or carrots, should be applied evenly to the heels, and properly secured by a light bandage, taking great care that the bandage does not press too tightly on any part, as, from the state of the heel, circulation of the blood is easily disturbed; the poulticing should be continued for several days, and must be removed and renewed three times a-day; and when removing the poultice, a moist sponge may be used in removing any hardened pieces from the sores. A little of the following simple and readily procurable lotion may be applied twice a-day:—Acetate of lead, 2 drachms; water, 8 ounces. When the pain is allayed, the poulticing should be discontinued, but the lotion may still be used. In some cases, where the parts become very hard, a poultice may be applied for a few hours every third day. If the animal is at work, the heels should be carefully cleaned every night; and if it is necessary to wash them, they should be thoroughly dried afterwards, and a dry flannel bandage applied, which should be removed as soon as the limbs are warm and dry.

In many cases where the legs are much swollen, and the patient in high condition, it is beneficial to give a dose of purgative medicine, as 7 drachms of the best Barbadoes aloes, and 1 drachm of powdered ginger made into a bolus. Before giving the purgative, feed on bran mashes only, for twenty-four hours, and the same afterwards until the physic begins to operate, when the horse may be allowed a small quantity of hay.

PRACTICAL HORSE-SHOEING.*

OF the many subjects that have engaged the attention of authors, and upon which they have written much, with possibly the least amount of resulting substantial benefit, horse-shoeing stands peculiarly prominent. When we look over the list of works that have appeared, and the names attached to them, we are at once struck with their magnitude, while we have to lament so much ignorance abroad, nestling under an amount of supposed knowledge, the effects of which are felt only by a servant whose mouth is sealed, and whose premature decay fails to convince the learned in these matters that the end is but a common event in the sequence of changes, the offspring of bigotry and want of the power of even ordinary observation.

It is unfortunate for the veterinary profession that such a partiality for traditional dogmas and "old wife's fables" are tolerated to such an extent. Shallow minds, unable to make deductions in higher matters, are, alas! too much in the ascendant, and not merely allowed, but even solicited to retail their logic upon this to the entire exclusion of common sense, and study of comfort and well-being of one of the noblest creatures that has been given to man. The almost exclusive and essential principles that are acknowledged in horse-shoeing are those that prescribe plenty of paring and rasping of the hoof—direct mutilation in the place of providing the required defence. Horse-shoeing now-a-days may be interpreted *horse ruination*, and upon this topic grooms and coachmen dictate authoritatively; the farrier instinctively looks up to them as distinguished luminaries, and all derive some substantial benefit. But the horse suffers in his feet and the owner in his pocket. After paring and rasping, and almost drawing blood at each shoeing, each looks on with amazement when the creature "goes tender," or is still worse, "lame," and the science of leather soles and stopping is resorted to. As a plaster to a broken head, they may do some good. At all events they help to make a bill, and so matters go on in these days of enlightenment.

Mr Fleming, with his ever busy pen, has furnished us with a neat little work within the compass of every man's pocket, and in the scope of every mind that can comprehend a horse. It is the first of three essays to which prizes were awarded by the Scottish Society for the Prevention of Cruelty to Animals, and properly exposes the crudities and absurdities of the present irrational system of hoof-mutilation, while the subject of conservative shoeing is advanced in a most efficient yet simple and masterly style. The author has had, and still possesses, opportunities which have fallen to the lot of few men of his profession, and upon this subject speaks from a position which is rarely attained by others. He has faithfully exposed the errors which bring confusion and dismay by disease, and, in terms of equal truth and simplicity, details the methods long since tested and found to obviate all of them. It is seldom we feel called upon to speak with such unqualified satisfaction upon works of this kind, but in this instance, to be faithful, we have no other choice, and earnestly recommend all lovers of the horse to share our pleasure in reading for themselves, for with the reading they may derive profit and be enabled to save much suffering in their noble favourites. We forbear to give quotations, having no desire to weaken any point of the subject upon which the author treats, by isolating it from the rest of subject-matter not admissible in such a notice as this. The reader will at once see the force of this by referring to the work itself, which, although small, is most comprehensive, clear, and highly interesting.

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* By George Fleming, F.R.G.S., M.R.C.V.S., &c. London: Chapman & Hall, 193 Piccadilly.

The Dairy and Poultry-Yard.

DRYING UP COWS.

THE following remarks, communicated to the *Albany Country Gentleman* by Mr H. Stewart, will be read with interest:—

There are two sides to most questions, as there are undoubtedly to the serious one to many farmers, how shall they manage their incoming cows, whether to take pains and trouble to dry them off at certain times, or whether they shall permit them to give milk as long as they may? This alternative relates, it is true, under the present condition of our dairy stock, to but a small proportion of our cows; but yet it is a serious question to those farmers who possess good stock and feed high. Common stock fed on dry hay or straw very seldom give any trouble in this way; but there is another class of stock which need very careful management to prevent mischief arising at critical times. It is certain to me, as resulting from my own experience, that many severe cases of garget, caked bag, or inflamed udder, occur from improper management, or even sometimes, in spite of all care, when large milking cows are attempted to be dried off.

The question affects the interests, to a great extent, of every farmer who keeps cows; and when we remember that the average yield of the cows throughout the United States is certainly less than 4 quarts daily, it is readily seen that to their short period of milking, and their long period during which they are either naturally dry or are artificially made so, a large proportion of this barrenness of profit is due.

Now, it needs no argument to show that this practice of drying up cows is unnecessary. In the experience of almost all who keep good cows it very often occurs that some of them must always be milked for some time before coming in to prevent evil consequences, and I have had several cases in which it was quite impossible, with all my efforts, to get a cow dry, and have seriously injured a valuable animal by persisting in such efforts. Now, is there any reason why, in such cases, this practice should be enforced? It is said the cows and their calves are injured. How can this be if the cow is properly fed? Is it not in practice constantly occurring among the stock of the most careful and scientific breeders of first-class milking cows? And if they can get through such difficulties with safety, why cannot others? The ordinary practice is to feed a cow that is to be dried off, with dry and poor feed—that is, poorer than when she is in milk, such as hay, and that very rarely of the best, and straw or cornstalks. I think this is of more injury to the calf, and withdraws more from its natural supply of growing material, than when the cow is fed liberally and what milk she will naturally give is taken from her. Then when the new flush begins to come on in a cow that will milk 20 quarts a-day, it is a matter of the greatest necessity that her milk should be drawn from her. I have had cows that I was forced to milk for a-week or more before their coming-in, and have drawn 10 quarts at a milking for some days previously. This was necessary to save them; neglect, or an opposite course, would have been fatal to them. Now, if such cases do occur, although I admit they are extreme ones, why should we not make an effort to get all our stock into like condition? Such cows are very valuable and profitable, and if they were more plentiful, or if such was the general character of our cows, would not our milk product be vastly increased? If there is really reason why such cows even of common native or grade stock should readily bring £20 in the market, as they certainly do, when others hardly bring £6 to £8, why should farmers not make an effort to raise the general standard to this level? They certainly cannot hope to do so by following the common practice of drying off their cows three months before coming-in, for this tends the opposite way; then their only course is to endeavour to induce a plentiful and long-continued flow of milk, and encourage the growth of such stock as will not permit of any drying up at all. The talk about cows being artificial creations and not subject to natural necessities, is not exactly correct. A shorthorn cow is able to safely produce a calf under such circumstances of high condition as would frighten the owner of an ordinary stock cow, and yet is the one not as natural a creation as the other? Her condition is different certainly, but she is still subject to all the natural laws of cause and effect that affect the other, but her habits are different; and she has been educated—if I might so use the term—to a different standard of necessity from that of the common animal. It seems to me that this is a point for careful consideration and worthy of discussion. The practicability of keeping cows in milk much longer than is generally the case is fully established; that cows of this character readily fetch extreme prices is also fully realized; that by care in breeding and management the character of cows may be advanced, is another truth; then the question remains, can we safely so treat our cows that their milking period may be extended as far as possible without any injury to their progeny, and can this peculiarity be fastened on our stock as a permanent one? If so, we make a double gain; in increased value and in a saving of all the trouble incident to drying up our cows.

The Country Gentlewoman.

SEARCH FOR COUNTRY HOUSES.

7E are drawing toward the season of the year when out-bound trains the city shew the eager faces of those re in search of a country house for the er. It may be high rent—it may be ing place for the little ones who feel ramp of city pavements—it may be spasm of economy which rebels at last st the inevitable and constant outflow of diture in the city; it may be a sudden sh of some dormant rural instinct and g; but whatever may be the cause, the s undoubted, that with every-recurring there is a crowd of citizens who give a r a week—as it may be—to country- -hunting.

ey have talked it over for a month past city firesides; they have consulted the -agents' lists; they have read the adver- nts in morning and evening journals— d down; but at the end of all they find elves very much befogged—very doubt- issues—very shaky in purpose.

we possibly give them a hint or two ich to regulate their decision? Let us

t, then, If you are in business in the nd must be there every day or every l day, do not put too great a distance en you and the city. More than an nd a-half of railway travel, day by day, wearisome. You may grow to count , but if you count the hours, they will n you—hours in which you can read le purpose without peril to your eyes, hich are very blank in the summing

nd, Do not delude yourself with the that you achieve ruralities or country by living in a surburban town, where xes pursue you, and where grocers and butchers are as good leeches as if they bled you within the dominion of Gog and Magog. What you gain in rent, you may lose in time, and the sweating process of small cities is very like the sweating process of large ones.

Third, Do not jump to the conclusion that you will love the country because you are tired of the town. Some people tire of everything, and will keep doing so to the end. If you are bent upon trial, and are uncertain of your tastes, try and lease with privilege of purchase at end of a year or two years.

Fourth, Consider that what you may pay for land is much safer than what you may pay for architecture or walks, that have been patterned after parks. And if you are to have only your evenings at home and your Sundays, do not delude yourself with the notion that your land, however fat, is going to reward any horticultural or agricultural schemes. With such limited oversight, count such schemes as amusements only, and pay for them as you would pay for white kid gloves or a box at the opera.

Fifth, Consider that if your first approach to your proposed home is disagreeable, by reason of neglected highways, and slatternly houses, and unkempt yards, it will probably grow no better, and will be a standing grief to you and yours. The very aspects and surroundings of the station where you may land will count for a standing welcome or a standing grief. Villages that put a good aspect on these matters should have the credit they deserve, and which, in the end, they must surely win.

Sixth, Do not believe in total country isolation. Shops and schools, and churches near by, have their convenience: if you do not believe it your servants will; and too great isolation will drive you mad, except you are used to cook your own steaks, and to wash your own linen.

Seventh, Look well to the healthfulness of a locality: clean high roads, and brisk running waters, and rosy cheeks are good indications—perhaps as good as any tales from the "oldest inhabitant." Be quite sure, moreover, always and everywhere, that what you can buy or have for a song is usually worth no more.

Eighth, If you have horticultural tastes that are liable to crop out, take a practical gardener to see it; if you have architectural fancies that you want to develop in a series of repairs and alterations, take a practical builder to see it; but if you aim simply at an enjoyable home—the rest being merely subsidiary—take your wife to see it.

Finally, it is safer to judge of the attractiveness of a particular country locality while a wintry habit is still upon the trees and the landscape: you can see farther; you can see deeper. In March and April you can taste what the winds are, and measure the shelter that Nature has provided; you can also forecast more clearly what judicious planting can do for you. The chances are you will in early April see the roads and the mire and neglected village streets at their worst; and you will be free from that intoxication of the senses which comes of the leaves and blossoms of mid May.—*Mentor.*

THE

COUNTRY GENTLEMAN'S MAGAZINE

JUNE 1872

FARM LABOURERS IN EAST LOTHIAN.

WE have heard the practice decried in England, but it is the custom in Scotland to employ females at all kinds of hand-labour on the farm. The routine work of an arable farm cannot be successfully carried on without a strong staff of able-bodied female workers. All the lighter kinds of jobs, such as spreading manure, hoeing green crops, lifting grain behind the reapers, and winnowing, gathering and picking over potatoes, &c. We may also include turning over manure heaps. The women do this work better than men, and at a much cheaper rate. The demand for female outworkers is now very great, and the supply not adequate. On most farms, besides the houses needed for the hinds and "orra" men, there are also two or three cottages occupied by these outworkers. They are let by the year, rent free, the occupants being bound to supply two or three outworkers, according to the terms of bargain. Every worker, besides being paid a fixed money wage, receives 200 yards or 250 yards of a drill of potatoes.

Our own labouring population do not supply a half of the number required. A great proportion of the daughters of the ploughmen prefer going out as domestic servants. In former days, it was quite common to compel our hinds to supply at least one worker from each house—a hired-in stranger being often introduced, who received a half-yearly wage from the ploughman, and her weekly earinngs were paid to the hind, or ploughman. This barbarous custom, known as the bondager system, has been nearly, if not completely, abolished in this county; good servants would always endeavour to escape from a servitude which entailed such domestic discomfort.

Our great supply of female workers is from the Highlands, principally from the Isle ot Skye. We have them comfortably housed. Every farm nearly has a house fitted up for the purpose. A great deal has been written and spoken against the bothy system by wordy and windy philanthropists, but we can assert, from long experience and knowledge of the facts, that these bothies do not encourage immorality, and their occupants, as a class, are a pattern to others. They keep themselves entirely by themselves, and never mix with our own people at all, except in working hours. Many of their parents in the north occupy small holdings. We could give many instances of these Highland girls purchasing seed-oats in spring, and sending them to their friends in the north.

The wages of our workers vary according to the season of the year—viz., 1s. per day during the winter months, and we hear of 1s. 2d. being paid now. We have promised four weeks of harvest work, with 12s. and food, and during potato-lifting 1s. 3d. per day.

But the great mistake is paying a uniform wage during summer, making all the workers like penny pies. To obviate this we would recommend piece-work, if we could only organize a system of letting the hoeing of potatoes and singling turnips to our own workers by the drill. The present rise in their wages must eventually lead to this, as it seems absurd to pay good, bad, and indifferent alike.

In our last number (page 347), we gave the yearly gains of our men. We would now write of their general condition as working men, upon whose industry and anxiety for their employer's interest success depends. Our farm labourers, as a rule, are not given to migrate from one county to another. At this moment we would say that at least seven-tenths of those employed in East Lothian were born in the county. We know no class less given to change their mode of life than the labourers of our county. As a rule they all receive an excellent education. Our parish schools are taught by good masters. The children are all sent to school at about four to six years old, and remain there for at least six years—some of them seven and eight. They are taught to spell and read English thoroughly, and understand and construe what they read. Arithmetic is also well drilled into them. They are made to write well. Besides the three R's, as these branches of education are called, and history and geography, the children have all an opportunity of being taught Latin, French, and mathematics. We know of no greater treat than being present at an examination of one of our parish schools, which, under the present system, seem to answer all the purposes most admirably. The charge for each pupil is about 22s. per annum. We need scarcely add that parents embrace the opportunities offered for the education of their children in the most praiseworthy manner. It may be said that such a good education may be thrown away on children merely intended to hold the plough. But it is not so. It gives them the opportunity of accepting situations they could not fill unless a good education had been given them. The farm labourers of East Lothian, as a rule, are a saving class, many of them have considerable sums in the bank laid away for the rainy days of old age. The assessment for the poor is comparatively small—3½d. per £ may be taken as an average for country parishes. The rate is higher in towns, such as Haddington, where there are a large influx of Irish, and where often many of the aged Scotch labourers in the county retire.

We confess it is rather hard upon town ratepayers having to endure the assessment, because the Irish who reside in these towns work entirely at farm labour; but as long as the Poor-law Act for their provision exists in its present form, what "can't be cured must be endured."

Our labouring people, for the most part, are cheerful and contented; and masters have themselves to blame where this feeling does not exist. Nothing gives a servant more satisfaction than the knowledge of his master's appreciation of his services when they are conscientiously performed.

A PLAN FOR ABOLISHING LIVE PIGEON SHOOTING.

VERY ingenious plan has been invented by Mr George J. Bussey, of useum of Arms, Peckham Rye, for ng sport to marksmen without inflict- cruelty to live animals, which, he con- is involved in firing at pigeons caged ps. We must confess we are not ; those who consider that a vast amount umanity is displayed in the ordinary e of pigeon-shooting, as it is conducted r principal gun clubs. Many of the nen and gentlemen who are the most nent members of these clubs are well- humanitarians. They would not e to see a horse or an animal of any bused, and the cry about the outrage rated upon pigeons by them is founded, appears to us, upon very superficial of the rules of the sport.

pigeons, it is supposed by many, have ance whatever against the "murderous They are "cribbed, cabined, and con- ' without the slightest possibility of . The deadly, or the bungling shooter, with his fowling piece ready—muzzle or breach loader, as the case may be—lazes away, straight, or fleukingly, upon inged creature as soon as the order " has been given. This is not like the at all. Any pigeon in a trap has far more tunity against its human antagonist than ying about the woods in which it likes ld its home, or about the clover and real fields, and the young turnip brairds, it is pleased to devour. It has five es to one for life, in a caged condition, t which it has when free. There are aps placed in a radius of twenty-five and the sportsman knows not out of the bird is to fly. It requires there- very trained eye and a skilful hand to the bird down within the distance the of pigeon shooting clubs demand.

ny birds, it is said, are maimed and ded in this, so called, cruel sport, and left to die in agony. We do not believe that more pigeons are left in this condition at gun club matches, than partridges are in turnip fields, or pheasants, or hares and rabbits in covers, where too many men who know not how to handle a gun are invited; and sometimes, unfortunately, to the fatality of the best pointer or setter, and not unfrequently to the injury of the gamekeeper or his employer.

Then, again, it is contended on the part of those who decry pigeon-shooting on the ground that it is wasteless, as well as heartless cruelty, inasmuch as those who shoot them do not care for them as food, in the same way that partridges are so appreciated. This is a strange statement. As a rule, those who kill partridges do not kill them for the mere purpose of gourmandizing upon them, but for the love of the excitement in firing at and bringing them down, and for the pleasure in presenting them to their friends. As to pigeons not forming a staple of human food in the same way as the nibblers in the stubbles and the crouchers in the turnip and potato fields do, we shall say nothing, but will only kindly ask those who think and say so, to consult the principal poulterers as to the respective numbers of pigeons and partridges passing though their hands into consumption in the course of the year. Pigeons find their way into the hands of the many; partridges only into those of a few, and the cheapest bird furnishes the most food.

Having said so much in defence of fair and legitimate pigeon shooting, we must also remark that it is sometimes prostituted to purposes of gambling, that chicanery, instead of skill, on occasions, carries the day. When the shooter knows, by collusion with the trapper, out of which trap the bird is to rise, then the sport turns to cruelty, and something deserving even a harsher appellation.

And now with regard to this new plan

for abolishing pigeon shooting, which is to be witnessed at the Museum of Firearms, where sport can be obtained without the sacrifice of life. The birds consist of a piece of sheet iron, or tin, made after the fashion of a screw propeller of a steamboat, with this difference, that there are only two flanges instead of three. These "dummies" are placed upon an instrument inside of which there is a spiral spring; this, when touched by the puller of the cord attached to the trap, sends the birds up in the air in a gyrating fashion to a distance of some 50 or 100 yards, but we must confess that the motion is very unlike that of a pigeon, and that the figure the supposed bird presents to the fowler is very unrealistic. It appears more, as it is flying, like a corrugated disc, and its motion, if indeed it resembles that of any living bird, is more after the sharp sudden jerking of a snipe, than a blue rock. Then, again, there are here only two traps, and the motion being from left to right, and *vice versa*, a practised marksman standing in the centre need not trouble himself to care from which side the imitation bird flies. This is very unlike the real pigeon shooting where five traps are employed, and the fowler has not the slightest knowledge out of which the victim has to come.

But while we have no idea that the "gyro pigeon," as it is called, will ever supersede the clubs at Hurlingham, and elsewhere, we can recommend it thoroughly as a capital practice for sportsmen. The cost of one hundred "pigeons" and the whole of the paraphernalia connected therewith, with the exception of ammunition, is contained in a box not more than about 15 inches long by 9 broad. Then the pigeons, like cats, are calculated to have more than one life—they have two-thirds of the proverbial number of the feline creature—six—so that six hundred shots can be fired before the birds are riddled through, or made incapable of flying. For gentlemen who have parks, and who wish "to teach the young idea how to shoot," the "gyro pigeon," we think, would be an inexpensive luxury. This is the highest praise we can accord it.

A MODEL AGREEMENT.

By Mr Henry Corbet.

I DO not believe in a model agreement. That is to say, I do not believe that any man or body of men can sit down and frame an agreement which should be accepted by all the rest of the world. The different circumstances of soil, practice, and custom, the several systems upon which either landlords or tenants hold possession of their property, the very social conditions of the contracting parties, must all tend to defy the application of any hard line and rule, however well intended, or however nicely adjusted. At the same time nothing would promise to be more advantageous than the consideration of such individual essentials as would go to constitute a model agreement. In no way has the advance of agriculture during the last quarter of a century or so been more promoted than by the habit of "talking about" hiring and letting land. We may perhaps have not done much in this direction by Act of Parliament —the farmer never has done much by Act of Parliament—but by other means we have done something to expand the minds, and quicken, as it were, the business-like capabilities of landowners, land occupiers, and last, though certainly not least, of land agents. Noticeably enough, amongst the most useful contrivances towards such an end has been the employment of a certain species of martyrdom. Ever and anon for a few years past there has been found some patriotic gentleman ready to sacrifice himself for the public good. With this aim he studies and busies himself over the production of a liberal lease or a model agreement; and having called a meeting, heroically presents himself as a target for everbody to fire at. The world probably never knew there were such obsolete musty conditions in existence until they saw these paraded in a model agreement; the tenants were often in happy ignorance of how they were actually or might be hampered, until they heard "our" lease read out in the market-place, and no man ever came to really see how little trust he could put in his fellow-man until he began to arrange for the letting or the taking of a 500-acre farm.

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* Read before the Maidstone Farmers' Club.

A SUFFOLK "MODEL LEASE."

It may be serviceable to shew how such small mice have been born of such great labours, and how these elaborate patterns have never come into the fashion. Some ten years or so since the Suffolk Agricultural Society laid very happily, as it seems to me, the lines upon which any improved or modern agreement should be built. The committee offered a prize for "the best and shortest form of lease adapted for the county of Suffolk, giving the greatest liberty to the tenant, consistent with the interest of the landlord." Nothing could, at least at that time, have been more prettily put and nothing could have been more impotent than the result—a very small mouse indeed. The tenant's liberty, as interpreted by the prize lease, compelled him "to consume and convert into good manure, with cattle or sheep, all the hay, stover straw, chaff, colder, haulm, fodder, cloves, tares, artificial grasses, cabbages, and green crops, except such straw as shall be required for the thaching of the buildings; and all turnips and root crops." He had liberty not to remove earth or mould from the banks of fences within 5 feet of the spring or quick. He had liberty to preserve the game for the sole use of the landlord, his friends, and his servants; as even in a lease adapted for the game-ridden county of Suffolk, not a word was inserted in protection of the tenant against any excessive abuse of this kind. He had liberty to allow the landlord to plant as often as he chose in all corners and hedge-rows, and he had liberty to pay a £50 penalty if he did not duly protect these young trees; while he had the further liberty to do nearly all the repairs, and to keep in proper condition "all glass and lead of windows, the going gears or pumps and wells; all gates, stiles, posts, pales, rails, fences, ditches, water-courses, channels, under-gate ways, racks, cribs, mangers, shutters, locks, bars, bolts, hooks, and hinges;" or, as there should have been added in this best and shortest form of prize lease. cribbage-boards, hurdy-gurdies, and slate pencils. The Suffolk model lease being pretty generally pronounced about half-a-century or so behind the age, did not attract much attention, but fell, as it deserved to do, still-born, and is by this time probably forgotten, even in the land of its nativity.

A "MODEL" AND A "ROYAL" AGREEMENT.

Another offer, however, during the same year, created a deal more sensation. This was a premium of £50, given by Lord Lichfield, for the best form of farm agreement, an offer which brought an immense amount of competition, while a tenant-farmer, Mr May, was eventually declared to be the successful candidate. So far this was sufficiently satisfactory; but instead of a tenant's own notion of an agreement being at once published and submitted to the criticism of his fellows, a committee of land agents undertook to "touch up" and tone down the several clauses, and of course some very wordy warfare was the consequence. The paper, when at last put into circulation, was declared to be far more of a landlord's or land agent's production than that of a tenant, and its leaning pretty palpably all one way. The saving clauses were those which at the end of a term ensured the tenant payment for unexhausted outlay in the shape of purchased manures, bones, lime marling, and other fertilizers of a lasting character, *pro rata*, as well as in proportion for the corn, cake, or linseed consumed. On the other hand, the tenant was bound down "not to have more than two-fifths of the arable land in wheat, and at the conclusion of his tenancy not more than one-fourth in wheat, nor more than three-fifths in white straw crops in any one year"—not to sell any hay, straw, mangold, or turnips off the farm, unless by special permission of the landlord—to properly manure all grass land mown for hay—not to kill any of the rabbits from the 1st of April to the 1st of November—to give over all right to the game to the landlord, and not to claim any compensation for damage done by game "unless when let to a third party." Of course game never should be let to a third party, though the insertion of such a condition was evidently well considered here, as since Lord Lichfield's prize agreement was propounded a leading landlord of these parts has, it is said, adopted the practice of letting the game over the heads of the tenants without ever consulting them, beyond offering the alternative of grinning and bearing it, or of throwing up their occupations. This model agreement was never accepted as such, nor, if I remember right, did one subsequently prepared by Lord Lichfield himself fare much better; but I see that his lordship and the Staffordshire committee are now going to work again on another agreement, as are Lord Leicester and the Norfolk farmers, and it is to be hoped that practice may make perfect. Still, it is only fair to say that Lord Lichfield's agreement was in certain quarters considered "as complete as any we have seen," though this perhaps was not saying much; and another farm, "embodying the best part" of this, positively received a premium from the Royal Agricultural Society of England. Here are some of these precious prize clauses: "The landlord shall reserve all rights to the game, hares, fish, and rabbits, and through himself, friends, and servants, to preserve the same, the tenant having *liberty* to destroy the rabbits at any time by ferreting or digging, but no dog to be used between the 1st of April and the 1st of September. The tenant not to plant two crops of wheat or more than two white crops in succession, nor to have more than three-fifths of arable land under corn or seed crops of any kind in any one year. To consume upon the farm all the fodder, hay, straw, haulm, and roots of every description, except so many tons of potatoes, so many tons of hay, and so many tons of straw, which may be sold in any year on condition that the full money in value is returned to the farm in oilcake or artificial manure; notice in writing to be given to the landlord of intention to make every such sale. To prevent all thistles, nettles, and docks from seeding on any part of the said farm, as also all weeds in the hedges, ditches, and waste lands;" or, as the prize essayist might have run on, to keep his piano in tune, his baby from crying in church, and his big bull from breaking out of bounds. Only imagine a Royal Society's prize agreement of the year 1868 enacting that a farmer shall keep all his dogs chained up—for to this it comes—for five or six months in the year lest they should give chase to that sacred animal the rabbit! And that the man shall not sell a sack of potatoes nor a truss of hay without giving due notice in writing of his being about to enter upon so stupendous a transaction!—and then dutifully handing in his bills, all of course properly receipted, to shew that he has brought back the equivalent!

TWO WELSH "MODEL AGREEMENTS."

Such good works as these could but bring good fruit, and in due course followed the Welsh or Carmarthen agreement, in introducing which its author precisely stated that "the cardinal points to observe were that the tenant should have full liberty to farm according to his own ideas"—that "the term of every tenancy should be embodied in as plain and brief a manner as is consistent with perfect clearness—and that this should not read a homily to tenants on the way they should manage their farms." Accordingly, by way of giving a man full liberty to farm after his own fancy, we have the strictest covenants introduced; enacting that he shall consume on the farm all the green crops, hay, straw, muck, and manure; that he shall not breast-plough, pare or burn without special permission—that he shall not have in tillage in any one year more than so many acres—that he not carry away from off the premises hay, straw, corn in straw, green crops, k, or manure—and that he shall on no unt be allowed to kill a rabbit with a —so carefully still are the interests of this ed animal looked after in a model agree- t. Unfortunately, this model document left to a legal friend to prepare, and as a sequence it abounded in all the prolix ses of a lawyer's office; as indeed one lly critic said, "it was much too long, likely to lead to law," about the very lest thing he could have said, and I need cely add that this remarkable specimen of rty, simplicity, and brevity did not "go n" in South Wales. Nevertheless, strange t may sound, this attempt seems to have to the production of another model sh agreement of a still more extraordinary acter. The author here, another land t, stated in the outset that "the chief g wanted in many districts to secure the d advancement of agricultural prosperity a more liberal construction of agree- t," and he straightway publishes a paper, flowing with covenants and bristling with lties, whereby the tenant is instructed, or e directly ordered how he shall set about simplest acts of husbandry. He is not now his grass lands more than once a ; he is to cut down before seeding all the ds; he is to apply regularly a sufficient ntity of lime; and he is to carry all the ds to a convenient place, where they may otted and mixed with the lime; he must sell a load of hay, straw, or manure; he t preserve all the game and the rabbits; if he wishes to leave home for a month ust obtain his landlord's permission be- he starts! To their credit, be it said, Welsh farmers have not been very ready ake such a thing as this for a pattern. In atest edition which has been published, is, in Lord Leicester's lease, the tenant ound down "to deliver so many wag- loads of good wheat-straw at the les"—"to do so many days' work of horses for the landlord"—to "cherish, up, prune, and preserve the fruit trees" d "to deliver one good fat turkey at the house in the month of December in every year." I have collated thus much to shew how much some men have still to learn when they engage upon the construction of a model, or, I should prefer to say, a modern agreement.

GENERAL PREFERENCE FOR UNFETTERED ACTION.

Many of the mistakes I have cited are but the carefully hoarded precepts of a bye-gone age, as the attempt has been continually made to associate agricultural advancement with obsolete practices. Look, for instance, to the vulgar error so pertinaciously repeated even in the *Journal* of the Royal Agricultural Society, which stays a man from selling a shilling's worth of hay, straw, or roots, excepting under certain specified conditions. Half a century or so since, when guano, phosphates, coprolites, and the hundreds of other artificial manures and feeding stuffs had never been heard of, there might have been some sense in binding a man down to consume all his hay and straw, or to bring back in proportion as much farm-yard manure for every load he sent off. But such arguments apply no longer, such covenants are alike to the disadvantage of landlord and tenant. The cake or manure bill of a good farmer in these days would serve to lay the ghost of his own father a deal quicker than any attempt to exorcise him by priest or candle. *Tempora mutantur*, and our leases and agreements must change with the times. The more modern form, instead of stipulating as to what shall and what shall not go to market, should take care that permission be given the tenant to sell anything he likes but his vote and interest and his wife and family. Again, let us avoid that old musty provision, so religiously reproduced in the Royal Agricultural Society's *Journal*—that a man shall not take so many crops of this or that in succession, but shall "cultivate and manage the said farm and lands in a good and husband-like manner." Why, of course he will, if he study his own interest, and the best plan will be to let him cultivate "the said farm" on any system he finds to be the most profitable, without dictating as to when he shall do this, and when he must do that, as if he were a school boy, instead of a man who should know his own business. When Mr Mechi and Mr Prout, and Alderman Cute and the *Times*' Commissioners, tell us of the wonders which can be achieved by the improved cultivation of the soil, do these great authorities ever contemplate a man going to work with his hands tied? *Farm as you please and sell what you like*, should be the main condition of the modern agreement, due provision, of course, being made for bringing the land back into something of the customary rotation by the end of a term. But I can fancy some old stagers and cautious men of business shaking their heads and intimating with a half sigh that we are talking too fast here. More than four years since, indeed, when I ventured to broach such opinions as these, I was met by Mr C. G. Grey, of Dilston, the well-known land agent, who said, at a meeting of the Hexham Farmers' Club, in answer to my objections against restrictions advocated by himself, that you would not find many who would agree with such dicta as—"This is the rent, there is the farm, cultivate it as you like." These were not quite my words, but they are near enough, and in a-week or two from this time, at another meeting in the north, of the Morayshire Farmers' Club, Mr Geddes, who read a paper, said, "Let it not be supposed that laying down in a lease any number of complicated clauses will preserve the condition of the farm with a bad tenant. He will side through them to its destruction, and yet keep within the law." At the Kelso Farmers' Club, at just about the same time, Mr Robertson said: "It would be a mutual benefit to both landlord and tenant to allow the tenant to farm his land for the first fourteen years as he liked, leaving it at the end of his lease in whatever shift was named in the conditions of let;" while Mr Usher asked, "Why should leases in this age of freedom and of high farming be hampered with any restrictions about cross-cropping?" I was enabled to answer Mr Grey out of his own latitudes, where I find the "many" rather with than against me in advocating freedom of action in modern farming.

LORD LEICESTER'S LEASE: MR HOPE'S CASE.

This, however, happened some years since and some distance off, so that it may be as well to trace opinion and practice down a little nearer to our own doors and times. What, then, is the chief clause in the famous Holkham lease, as issued during this year of grace 1872? I will read it to you. "6. The tenant is to cultivate and manage the farm during the first sixteen years of the term according to his own judgment, and to have full power during such time to dispose of all or any portion of the produce of the farm by sale or otherwise. During the last four years the tenant shall bring the arable lands into the four-course system of husbandry practised in Norfolk." Here, in a word, is all I asked for long ago—Farm as you please and sell what you like. But I must go further still, and try land agent by land agent, as it is but a few evenings since I heard Mr Clutton, one of our most extensive land agents, declare that his favourite form of lease was to let the tenant farm very much as he pleased until within the last two or three years of his term. All this makes the Royal Society's prize form of agreement sadly out of date. But Mr Clutton said more than this: with all his long experience in different parts of the country, he stated that short holdings with tenant-right or Lincolnshire compensation covenants, were more in favour with the farmers than leases for long terms; "all they required was liberty of management and fair tenant-right." Of course no model agreement, or model lease either, can be now regarded as complete without these compensation clauses, allowing proportionate payment to the tenant for improvements he has entered on, but for which he has not had time to reap the full return. Here is a very weak place in the Holkham lease, where little or no provision of the kind is made, pointed as this omission is by the now notorious Fenton Barns case. Had there been compensation clauses attached to his nineteen years' lease, Mr Hope could have had really no cause to complain. It is true he was farming highly and well, that he was an old tenant, enjoyed a good character, and so on; but if a man wants to maintain his possession on these pleas, the rights of property would, no question, be invaded. Every landlord has the power to change his tenants if he so please, and let it be ever borne in mind that, or one such disturbance brought about by bad or slovenly farming, there are fifty which might be traced to differences over party olitics or game abuses. Hence the reater reason to be protected, and I care ot whether you hold under a long lease or yearly agreement, to make the most use of our time and the land we must have a eneral recognition of the tenant-right custom. ome of your customs are the rather to be voided than imitated, and instead of payments for acts of husbandry, that which we want is payment for acts of improvement, of hich the outgoing tenant has not had an pportunity of reaping the due benefit. These acts are comprehended in chalking, marling, and the beneficial use of lime, ones, guano, oilcake, and ashes; as I hold at the more expensive or permanent works, ıch as building and drainage, should only e engaged upon by special agreement, as, roperly classified, they are not tenant's but ındlord's duties.

A LESSON TO LAND AGENTS.

When I accepted the invitation with which ou thought fit to honour me, I had some notion of putting a second title to this paper, ıd writing it as a "Lesson to Land Agents," ıd I should still wish to dwell a little on this ranch of the subject. In the outset, then, must put it as a very wholesome ethic, that) lawyer should be suffered to undertake e office of a land steward or agent. His vn interests, or at any rate habits, are ›mmonly opposed to agricultural advancement, as no doubt half the musty, out-of-date, ıintelligible, technical forms of agreement, hich tenants are called upon to sign, come raight from the hands of the copying clerk, ithout perhaps the alteration of a word or line in a generation. Even further, no man is so timid or so dangerous as an ignorant man. The less he knows the less ready will he be to commit himself by doing anything out of the ordinary routine. At best the lawyer-agent is but a dead weight and a drag-chain. In the Holkham lease, after giving in the outset the tenant full liberty of action, power is subsequently reserved to the landlord of stepping in during the term and ordering the cultivation to be at once brought back to the system of the district. This is no doubt an immense power for any one to wield, but in the hands of an inefficient agent it might often become an instrument of torture. I do not for a moment intend to make any application here to Lord Leicester or his agent, but I must repeat that in the hands of incompetent people this power to recall would be a very dangerous instrument, and I should prefer to see the next issue of a liberal lease free from such a condition. In any case, no such reversionary power should be exercised, save on arbitration by two independent valuers. Of course the plea is that the owner's interests must be guarded, as indeed in most of these agreements the very kindest feeling is evinced for the landlord, and little or none for the tenant. With, however, an agent who knows what he is about, the landlord's interests should be tolerably well insured at starting—that is, in the choice of a tenant. Mr C. R. Grey, of Dilston, whose name I have already given you, as himself one of the most eminent of our land agents, says, "nothing destroys an agent's influence or a landlord's popularity more than treating every application from tenants as if it were an attempt to overreach the agent and mpose on the landlord' —a maxim which might be framed and glazed forthwith. Again: "Retired soldiers and sailors do not generally make good agents though they have some qualities which are useful, such as punctuality and carefulness. Retired butlers and house stewards may be estimable men, but they are not such as should be set over tenant-farmers. Poor relations for whom some provision is desirable, would generally cost an owner less if he were to make them an allowance to live at Bath or Cheltenham. Mercantile men are apt to look at everything in a purely mercantile spirit, not seeing distant or contingent advantages. Farmers who have failed in farming have the disadvantage of undertaking to manage another man's affairs when they could not manage their own; nevertheless, when their failure has been owing to want of capital or unadvoidable calamity, and when they are educated and upright men, they frequently make good agents. Head clerks promoted from the office are very apt to find themselves in a position for which they are unfit, having been too much bound to routine and detail to take large views of management. They are apt to be too much the servants of the landowner, and not enough mediators between him and the tenants. Lawyers, attorneys, and writers, though frequently entrusted with the management of estates, are about the most disqualified. Their education, bent of mind, legal way of reasoning, and treating all questions, are a positive bar to success in the management of estates, and I consider it an absolute misfortune to the country that so many estates are under their care. From their special training they look narrowly into legal obligations and the rights of property, and from want of experience in country affairs they are incapable of judging of the propriety of modifying obligations which may be obsolete or inexpedient. Landowners in Scotland and Ireland, I believe, more than in England, commit the mistake of making such appointments." I do not always agree with Mr Grey, but how admirable all this is! And bear in mind I am quoting a land agent speaking of land agents. When Ben Jonson was told that Shakespeare had never blotted out a line which he had once written, the answer was, "Would that he had blotted out a thousand!" So I say to the land agents of England, look to your handiwork and blot out wherever you can.

TENANT-RIGHT: GAME.

Of course there must be all due provision made for the condition in which the farm shall be given up, and for this I repeat whether under long or short holdings the best guarantee is tenant-right or compensation covenants. By this means you induce a man to go on well to the last, or if he should go wrong he may be as readily met and made liable, under the same system of valuation, for any detriment he may have caused to the property. As regards the disposition of the game, we are fairly entitled to expect some reform from the labours of the House of Commons' Committee now sitting. Rabbits must be treated as the vermin which in the eye of the law they already are, their reservation being rendered illegal, and their destruction sanctioned as openly and generally as that of a rat or a mouse. Then, worst of all game abuses, the abominable practice of letting the shootings to strangers over the heads of the tenants must be abandoned, as neither landlord nor tenant should have the power to do so. Let the landlord be content with the winged game, and such a supply of hares as the farmers would preserve for him; and if he be a sportsman, and not a mere higgler, he will have little to complain of. The Duke of Beaufort has now no keepers but his tenants, and on some other large properties heavy game-preserving is being gradually abandoned. Nothing can tend "to make a landlord more unpopular" than an agent who is very jealous of over-exacting in this business of game-preserving.

FRAMING A MODERN AGREEMENT.

Let me recapitulate the points to be observed in framing an agreement in accordance with the times in which we live, the main principles of which should be liberality, brevity, and simplicity. Let all covenants which go to tell a tenant when he is to take this crop out and when that—be struck out. Let all covenants which go to dictate how much he shall sell and how much he shall buy—be struck out. Let any reservation, on any terms, of rabbits or such-like vermin—be struck out. Let any claim to feudal service, such as a payment in turkey cocks, the feeding of fighting cocks, the carriage of coal or the delivery of straw—be struck out.

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pon the ever varying circumstances of time, place, and personal position. Turn where we will, there is no subject growing so fast on public attention as the Land Question. It crops up alike in social circles and Quarterly articles. The outside world, if I may so term it, is especially prone to take the business under its care, and while some of the schemes propounded are wild enough, there are more moderate measures of reform, which no doubt sooner or later will come. Prominent amongst these must be some improved system in the hiring and letting of land. There is no denying the fact that farm leases and agreements are too generally susceptible of amendment; as it would be preferable that any movement in this direction should be instituted and carried through by the owners and occupiers themselves rather than as the consequence of pressure from without. And these views I submit not so much as a lesson, but as a study for land agents, as here the motive power will centre.

The Farm.

IMPORT AND EXPORT OF AGRICULTURAL COMMODITIES.

THE high price of meat does not by any means appear to entice foreign cattle to our shores. Notwithstanding the enhanced values realized at all our stock markets of late for beef, and the expense to which the Corporation of London have been at in the erection of the new market at Deptford, we have for the April of this year to chronicle a smaller supply than in the corresponding months of 1871 and 1870. In April of this year the number of beasts, taking oxen, bulls, and cows together, was only 8225; in 1871 they numbered 12,777, and in 1870, 9532.

The total value of preserved meat in the four months of this year exceeds by nearly £150,000 that of last. But what is this small sum compared to the vast amount of animal food which is consumed in Great Britain, and what to the almost illimitable resources from whence such meat is supplied, and which can only be furnished in a preserved state from Australia and South America?

Altogether, our preserved meat cost us in the four months that have passed, according to the Trade and Navigation Accounts, £306,906, as against £157,528; while for our live stock we were debited £1,054,489, to compare with £1,003,460 in the first hird of the preceding year.

We should notice here that while cattle decreased, sheep were imported more largely both in the month and four months than in he like period of 1871, the numbers being, respectively, 260,949 and 163,417. The price we paid up to the end of April this year was £515,545; last year, in the same period, we expended only £300,474.

For bacon our expenditure is rapidly rising—in greater ratio than our imports of swine are decreasing—the total number received during the portion of the year that has passed, being only 1815, as against 15,061. The receipts of bacon have risen, in the four months, from 406,221 cwt. to 936,113 cwt., and the cost from £1,046,928 to £1,900,499. For beef, salted or fresh, or slightly pickled, the sum we paid this year was £207,384, which was about £150,000 less than the sum disbursed in the corresponding period of last. The imports of hams have more than trebled in the portion of the year that has gone by, as compared with the receipts in the like term of 1871, and quintupled in comparison with those of 1870. The prices have not been quite so high as in 1871. The total amount we paid for this commodity up to April was £178,266. For other kinds of meat not enumerated above, we expended £68,439. Pork we imported to the value of £266,681, and poultry and game, including rabbits, to the tune of £57,215. Altogether, the total amount we expended on meat up to the end of April was £3,730,733.

The increasing demand for eggs shews the necessity we have often had to point out, of devoting more attention to poultry-yards at home. The amount we expended on this highly nutritious food in the third of the year that has fled, was no less than £686,999; last year £341,975 was the sum paid, so that in the four months the cost has more than doubled.

The imports of butter were not so large as in the first four months of 1871, being 352,343 cwt., to compare with 404,286 cwt., and the price £1,869,435 as against £2,090,098. The imports of cheese also were much smaller and the price cheaper in proportion, which em to indicate that we are devoting tention to the manufacture of this ity at home. In the portion of the st passed we disbursed for cheese 11, as against £667,925. The cost es rose from £13,717 in the first nths of 1871, to £79,345 in the cor- ing period of the present year.

mports of corn of all descriptions creased largely. Of wheat we had of 1,100,000 cwt. more in the four ; of barley we had upwards of o cwt. more; and of oats above half- n cwt. The total we paid for corn e end of April was £12,863,215, in e period named of last year only ,964. About half this year's expen- was on account of wheat. The tables shew the receipts for the nths, whence they were derived, and s.

QUANTITIES.

Wheat.	Four Months ended April 30, 1871. Cwt.	Four Months ended April 30, 1872. Cwt.
....	4,724,255	6,592,426
k	7,609	46,000
y	618,094	775,725
....	28,446	59,792
n Territories ...	59,822	2,641
, Wallachia, Moldavia	336,305	282,953
....	31	795,050
States	3,860,408	1,891,316
....	68,695	338,561
North America	135,522	77,589
ountries	54,199	168,147
Total......	9,893,386	11,030,200

VALUE.

....	£2,686,804	£3,768,779
rk	5,074	29,542
y	408,427	512,164
....	15,848	35,321
n Territories ...	37,846	1,604
, Wallachia, Moldavia	189,217	149,872
....	25	404,125
States	2,314,330	1,203,216
....	44,061	220,441
North America	80,540	50,733
ountries	32,314	105,189
Total	£5,814,486	£6,480,986

QUANTITIES.

	Four Months ended April 30, 1871. Cwt.	Four Months ended April 30, 1872. Cwt.
Barley............	2,126,059	5,180,436
Oats	1,413,697	3,225,855
Peas	154,801	150,414
Beans	701,431	1,084,392
Indian corn or Maize..........	2,918,947	5,054,669

VALUE.

Barley..	£846,198	£2,043,728
Oats	562,190	1,175,832
Peas	69,048	66,359
Beans	321,563	432,625
Indian corn or Maize..........	1,163,760	1,850,146

QUANTITIES.

Wheat Meal and Flour.	Four Months ended April 30, 1871. Cwt.	Four months ended April 30, 1872. Cwt.
Germany	225,436	317,318
France	1,178	114,010
United States	942,511	181,265
British North America	5,047	930
Other Countries	311,035	289,277
Total	1,485,207	902,800

VALUE.

Germany	£205,423	£289,261
France	742	106,065
United States	769,550	137,218
British North America	3,715	819
Other Countries	313,289	280,176
Total	£1,292,719	£813,539

With reference to manurial substances we notice an increase of about 3500 tons on bones, the quantities being this year 32,226 tons, as against 28,768 tons. The respective costs were £209,610 and £184,438. The imports of guano are decreasing as rapidly as the quality of many samples are deteriorating. Up to the end of April, all we received were 30,202 tons, as against 102,680 in the corresponding term of last year, and the cost only £275,515 to compare with £1,184,108. The Peruvian Government, therefore, is not making much by their uncourteous treatment of customers. There was a large falling off in the receipts of nitrate of soda during the month, but a slight augmentation in the longer period.

The sum we expended on this "artificial" in the course of the four months was £512,544, last year, in the same time, £422,946.

Turning next to feeding stuffs, we find that oil-seed cakes have been picked up rather more extensively in the month than in the like period of last year, but the imports were not so extensive in the four months. The sum our shippers paid in the course of the four months was £424,456, as against £486,957. Cotton-seed we received in larger quantities during both the periods for which the Returns are made up. In the month, we obtained 19,467 tons, as against 16,481 in April last year, but the price being much lower this season, there was only about £300 difference between the payments for the month of this year and last. Last April, we only paid for the 19,467 tons £162,952—the 16,481 tons in 1871 cost £162,634. For the four months the sum we paid for this article was £876,528, as against £853,552. In rape there was a great falling off noticeable in both periods, but in flax seed and linseed the reverse was the case. Clover and grass seeds partook of the general decline. Hops have risen immensely in value since last year. Up to the end of April we had received 38,799 cwt., for which we had to pay £236,375. In the same period of 1871, we paid only £196,631 for 66,745 cwt., so that the price has more than doubled.

The following tables shew the quantities of wool, and their values, for the four months of the present year. It will be observed that the imports have increased about five million lb., and the sum upwards of one million sterling:—

QUANTITIES.

	Four Months ended April 30, 1871.	Four Months ended April 30, 1872.
Wool, Sheep, and Lambs.	lb.	lb.
From Countries in Europe	8,334,219	12,692,032
,, British Possessions in South Africa ...	10,857,587	11,975,491
,, British India	8,188,075	7,187,742
,, Australia	89,608,680	86,171,921
,, Other Countries......	8,208,123	12,316,044
Total............	125,196,684	130,343,230

VALUE.

From Countries in Europe	£409,406	£745,036
,, British Possessions in South Africa ...	554,442	739,950
,, British India	282,519	310,173
,, Australia	5,185,478	5,425,185
,, Other Countries......	277,657	563,959
Total	£6,709,502	£7,784,303

About our purely agricultural home produce there is not much to record. Butter, we have sent away in slightly increased quantities, the value for the four months being £92,865, as against £79,048 in the like period of 1871. Cheese, however, was in less demand, the receipts for the third of the year being only £26,903, to compare with £37,237 last. There was an increased demand for our horses in the course of the month—France taking 191, as against 53 last April, and other countries 317, instead of 157—in all, 508; the average price was about £25. On the four months, however, there was a great deficiency in the exports, only 995 being sent abroad, as against 3333. The total amount received for horses, up to the end of April, was £55,235, to compare with £104,489 in the like period of 1871—figures which shew that horses have risen considerably in value.

Our wool exports were shorter in the month, but larger in the longer period than last year. The accompanying tables shew where the wool went to, the respective quantities, and the values :—

QUANTITIES.

	Four Months ended April 30, 1871.	Four Months ended April 30, 1872.
Wool, Sheep, and Lambs.	lb.	lb.
To Germany	939,666	850,347
,, Belgium	500,970	726,700
,, France...............	279,963	379,540
,, United States	318,114	1,260,249
,, Other Countries ...	547,099	392,430
Total	2,585,812	3,609,266

VALUE.

To Germany	£67,013	£70,485
,, Belgium	36,747	63,880
,, France...............	22,301	30,578
,, United States	16,904	93,011
,, Other Countries ...	42,957	39,172
Total	£185,922	£297,126

AGRICULTURE IN IRELAND.

CROP cultivation in Ireland, we learn from the agricultural statistics just issued by the Registrar-General, decreased considerably last year as compared with the previous one. 25,547 fewer acres were planted with the various crops. We do not know that this is a matter to be seriously regretted, as Ireland is better adapted for raising stock than for corn growing. Grass is good and abundant, and the climate is too moist for cereals. Cattle, it will be remembered, were more plentiful than in the previous year, and with our rapidly declining numbers in stock and dearness of meat, this is more to be rejoiced in than the decrease in the acreage of cereals is to be deplored. Corn we can readily obtain from foreign countries; cattle and sheep not so easily.

In these 25,547 acres we are sorry to note a large decrease in the growth of turnips—nearly half of the total decrease—as green husbandry we consider the foundation of profitable stock-farming. The extent under mangolds, however, had increased 6490 acres; under potatoes (which William Cobbett considered the ruin of the country) 14,851 acres; and hay, 55,193 acres. The decrease was, in wheat, 15,465; in barley, 20,306; oats, 13,903; bere and rye, 242; turnips, 12,024; cabbage, 1971; and flax, 38,240 acres.

The crops of the brassica tribe shewed an increase in average produce, as follows:—Turnips, 1.4 tons per acre; mangold wurtzel, 0.8 tons; and cabbage, 0.2 per acre. On the other hand, the yield of the cereals was not so abundant as in 1870, wheat and oats each falling off on the average per acre, 0.1 cwt.; barley, 0.3 cwt.; bere, 0.7 cwt.; rye, 0.5 cwt.; potatoes, 1.4 tons; flax, 12.1 stones; and hay, 0.1 ton.

Taking all the cereal crops together we find the total produce has diminished by 303,442 qr.; but the produce of turnips is 304,930 tons more in proportion to the ground occupied than last year. Mangolds also bulked larger by 108,948 tons; but there was a decrease of 1,424,804 tons in potatoes; in cabbage, 11,366 tons; in flax, 17,481 tons; and hay, 71,919 tons.

The total acreage under wheat last year was 244,451 acres; barley, 220,979; oats, 1,636,136; bere and rye, 11,555; potatoes, 1,058,434; turnips, 327,035; mangold wurtzel, 31,810; cabbage, 33,008; flax, 156,670; and hay, 1,829,044 acres. The total extent of land under crop last year was 5,621,437 acres.

From an interesting tabular statement of the crops during the last twenty-five years, compiled by the Registrar-General, we see that the greatest extent of land under crop in any one year during that period was in 1860, when it reached 5,970,139. Rye and bere have been gradually declining in estimation. Beans and peas likewise shew a great falling off, the decline since 1848 being from 62,590 acres in 1850, to 10,913 acres in 1871. On wheat there has been a still more notable decline in the quarter of the century. In 1847, 743,871 acres were grown; last year, as has been already stated, only 244,451. Since that time, also, the acreage of oats has fallen off from 2,200,870 acres to 1,636,136; barley has diminished more than 60,000 acres, and the average produce per acre has, in the case of the three principal cereals, declined likewise, which does not speak much for improved cultivation. In 1847, the yield per acre of wheat was 16.5 cwt.; of oats, 14.7 cwt.; and of barley, 17.4; last year the produce was only 12.1, 12.7, and 15.2 cwt., respectively. So that with all the stimulus of artificial manures and improved agricultural implements we have lost, in the aggregate, on wheat, about 1,400,000 cwt.; on oats, 3,272,272 cwt.; and on barley nearly 450,000 cwt. Great decrease in the weight of produce is also noticeable in other crops. It would be interesting to have a satisfactory explanation of these singular facts.

FURZE AS A FARM CROP.

FOR several years past, furze, whins, or gorse has been cultivated in many districts as a permanent foddering crop with much success and profit, by which horses cows, and sheep have been sustained. As the proper season has now arrived to prepare for and sow that crop, those who intend doing so should not put it off till later in the season. If the ground is clean and free from scutch grass and other root weeds, the seed may be sown with any spring corn crop, but it never should be sown in dirty land. It is quite true that when the furze gets established in the land it is sure to smother grass and other weeds, but when young and in a seedling state, scutch grass smothers the young furze plants ; a few may escape and become strong bushy plants, which are of little or no use as a feeding crop. A furze meadow should be thickly stocked all over with closely set plants, in order that they may grow up long, fine, without branching, and with few spines, so as to be easily cut with a strong scythe and prepared for feeding. Although furze seed may be sown with a corn crop, it would be much better to sow it alone. A corn crop exhausts the land more or less, and it does not afford so much food to the furze as it should get to produce a first-class crop the year after, unless it can be top-dressed, for which ½ an inch of bone dust is the best to apply for that purpose.

Furze will grow on any soil that is dry, and poor pasture land of little worth produces fine crops of furze fodder. If ploughed up now out of grass, well rolled to close and consolidate the sods, and harrow to pulverize the surface, it may be sown with the whinseed at once, and produce good strong plants the first season, which may be cut for use in the winter of the second year; but if, through greed, the occupant is tempted to sow a corn crop with the whinseed, the plants will be weakly, and much injured by the treading of the reapers and others employed to cut and save the corn. Although whins will grow and produce well on any dry soil, or even shallow bog land resting on dry clay or gravel, still the deeper and richer the soil the more luxuriant and valuable will be the crop; but on any land the seed must be sown so thick as to produce long straight stems without any branching, and but few spines, and to produce this effect it will take not less than 65 lb. of good sound seed to sow an acre. The seed should be sown broadcast, as evenly as possible, and to insure even and light cover, the land should be rolled before sowing, and the seed covered with the bush, fine grass seed, or chain harrow, for if buried deep it never comes up.

A good furze crop is a great relief to the farmer in feeding his working horses and milch cows during the winter, and saves much hay, now an article of high price. Horses thrive and become hearty on it, and able for any farm work, with little or no oats, and cows yield rich sweet milk, without any bad taste, when fed with whins; but they require preparation to at least partially destroy the spines.

A great variety of implements have been constructed from time to time for this purpose. Mr Walsh, of Stedalt, Balbriggan, has brought out a very improved and good one; and Richmond & Chandler's large chaff-cutting machine, with change wheels to cut into between one-fourth and one-eighth inch lengths, prepares the whins admirably when passed twice through it with a little straw; but the best we have seen is a combined cutting and bruising machine, constructed by Mr Irvine, of Athenry, which prepares the furze better than any other.

CULTIVATION, MANURING, AND CROPPING.

By Mr J. J. Mechi.

E meet here this evening to consider
how we may somewhat increase the
s' profit and the food of the people.
e not a necessity for so doing? Our
is in a very peculiar and exceptional
n. In 1801, we were 15,000,000, and
fed. Now, notwithstanding the Irish
and consequent depopulation and
tion, we number 32,000,000, and are
ly increasing. During the last century
re exporters of corn, and so late as 1837
re able to produce nearly enough of
grown food (with a few years of excep-
even up to 1846 our import of foreign
ad never reached 3,000,000 quarters
ingle year. Now, some 10,000,000 of
pulation are dependent on foreign na-
for their daily bread. It is painful to
upon the disaster and disorder that
probably attend the interruption of our
n supplies of food, for in that case
third person might be starved, and the
y involved in anarchy and confusion.
nnual agricultural produce, available as
n food and drink, is, according to my esti-
less than £150,000,000. Mr Lavergne
tes our total produce at only £3, 7s. per
£150,000,000), and the farmer's capital
per acre. Our annual consumption of
n eatables and drinkables amounts to
more than £89,000,000. We have,
ore, evidently a vast margin for in-
d home production, by agricultural im-
ment, including the utilization of sewage.
voidances from this £89,000,000 worth
eign consumables passed into our soil
d of into sewers and rivers, how much
land it would fertilize and how much
food would be produced! Our country
indeed then become annually more fer-
stead of more sterile. Surely it is the
of our Legislature and Government to
initiate and encourage all measures that will tend to the increased investment of capital and intelligence in agriculture. Those most required are greater facilities for the purchase or exchange of land, security of tenure by leases, valuation for tenant's unexhausted improvements, and power to life owners of estates to invest capital in necessary landowner's improvements. Acts of Parliament would do much to emancipate agriculture from old-fashioned and feudual customs, suitable only to a past and pastoral age, and give to it a more business-like and commercial character adapted to moderate circumstances and requirements. The home-grown food question is becoming rapidly more and more urgent. In addition to legislative changes, we must look more to science to guide and instruct us in agriculture. I have come to this conclusion after a careful study for many years of Baron Liebig's four great works—"Chemistry in its applications to Agriculture and Physiology," "Letters on Modern Agriculture," "Fifty Principles in Agriculture," and his last grand work, published in 1862, "The Natural Laws of Husbandry." We know practically how much benefit agriculture has already derived from a valuable member of our Club—Professor Voelcker. Our Royal Agricultural Society has for thirty years placed on the title-page of its annual volumes, "Practice with Science." Have we farmers all obeyed this command? Not yet, I fear, for there are still too many practical farmers who deprecate book-farming, but, although formerly they were a legion, their ranks are becoming annually somewhat thinned by the progress of enlightenment, and by a more liberal education of the rising generation, especially that conferred by the Royal Agricultural College at Cirencester. I venture to predict that within another century (which is not long in the history of a nation) our agriculturists will be found study-

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d before the Farmers' Club.

ing in their library the scientific principles of agriculture enunciated by Liebeg, Way, Voelcker, Playfair, and our other agricultural philosophers.

My object in addressing you is to endeavour to impress upon agriculturists the advantage and necessity of trusting more to scientific principles as a guide to practice in the art of tillage, manuring, and the rotation of crops. Time will only permit me to draw an outline, which must be filled up by a personal study and reflexion.

CULTIVATION.

If I ask for a definition of the word cultivation, I am told that it means the disturbance or upturning of the earth to a depth of 5 inches, or the thickness of a family Bible, which is the admitted substance of the British agricultural pie-crust; but when I ask why this particular depth of 5 inches (in preference to 10, 15, or 20) has been fixed upon, I can get no satisfactory or scientific reply. I presume it must be because a pair of horses (sometimes four, I fear) can plough at that depth 1 acre per day. We cannot call this either a scientific or satisfactory explanation. If the roots of plants descended only 5 inches, and found within that space ample nourishment for their perfect development, there would be no occasion to find fault; but we know that it is not so, and that plants send their roots down into the subsoil several feet, especially if it is in a suitable condition, which is very rarely the case, because it has neither been disturbed, ærated, drained, or manured. When I hear, as I frequently do, that high farming injures the barley crop, I smile, and reply:—"Mix the rich top soil with the poor unmanured subsoil, and you will then no longer complain of laid frothy crops, which injure young clover; do not sow too thickly. Here is a striking instance of the advantage derived from more deeply disturbing the soil and subsoil. In the presence of 700 of my guests, in July, 1856, Fowler's steam-plough, with Cotgreave's subsoiler attached, operated on three stetches of one of my clover-leas. The result was that, although all the field had been under good and deep cultivation, these stetches appeared, in the early growth of the wheat crop, as though they had received an extra dressing of manure; and for five years after, all the crops on those deeper-disturbed stetches shewed a manifest advantage.

Liebig says, p. 178, "Natural Laws of Husbandry:"—"Thus the subsoil, considered as a field apart from the arable soil, gives to turnips and lucerne a certain quantity of mineral constituents. Where the fields have a subsoil favourable to the growth of these plants, it is as though the arable surface soil were doubled. We hear great complaints about thin-skinned land. Whose fault is it? Mine was wretchedly thin-skinned thirty years ago, until I greatly deepened the staple by breaking up the subsoil under the ploughed land, still keeping the old soil uppermost. By these means the passive elements of the plant food in the subsoil became gradually active and available. Draining, of course, preceded the subsoil disturbance. All this has been and must be profitable. However much a farmer may be restricted in his lease, there is never any limit as to the quantity of soil he may use for the growth of his crops. It may be 500 tons per acre at a depth of 5 inches, or 5000 per acre at a depth of 50 inches. His rent, rates, tithes, taxes, &c., will be no greater on one than on the other, but his crops will be unmistakeably increased. Drainage must be used if the land is not naturally drained. There are, of course, loose friable soils that require compression rather than deep disturbance. Liebig attaches the utmost importance to deep and efficient tillage as an agricultural basis. Science has indicated that in the subsoil we should seek for increased profits; for it teaches us that in the great majority of soils the earth at every depth contains a certain portion of the elements of plant food, which only require æration and amelioration by disturbance, drainage, and manure, or by burning, to render them gradually available as plant food. Science has also discovered that it is not possible to manure the subsoil through the top soil, except in a very slight degree, for the latter has tne power of fixing and retaining very much larger quantities of plant food, ammonia, phosphate of lime, and potash) than are usually applied; only very small portions of these pass annually into the subsoil—we should, therefore, intermix the top and bottom soil. Farmers, as a rule, have no faith in the subsoil, but on the contrary, rather fear it, believing that there is something unwholesome under the cultivated crust, and that the interior of the pie is of the wrong sort. The fact is, that it is raw and uncooked, because it has never, like the top soil, been stirred and exposed to the ameliorating and fertilizing influences of the atmosphere, and in too many instances, for the want of drainage, air is completely excluded by the presence of stagnant water.

PLOUGHING AND CULTIVATING.

Here let me draw a distinction between ploughing and cultivating—great injury may arise from suddenly upturning the raw subsoil and burying the friable top soil while much good will result from breaking and loosening the subsoil, thus permitting some of the top soil and manure to fall into and gradually intermix with it. Some subsoil may be safely brought to the surface, but this is not generally the case; a trial of the subsoil in some flower-pots will soon enable you to judge. Certain folks are, however (thanks to steam-power), now disturbing the contents of the pie most resolutely and fearlessly, both in hop gardens and elsewhere. At Farringdon, in Berkshire, two sets of Fowler's 30 horse-power engines are cultivating, or breaking (not ploughing) the land to a depth of 36 inches. Messrs Fowler, of Leeds, wrote to me, in reply to my question:—"There is no doubt that the larger the engine is, the more economical it is in point of fuel; but the great difficulty we have to contend with in these large engines is the unprepared state of the land for steam cultivation. If there were larger enclosures, and proper roads were made, we should certainly then say the larger the engine the better; but in the present state of things it is better, except in some special cases, to have engines of a moderate size. Mr Campbell's engines work very well, and are doing 4 or 5 acres a-day, 3 feet deep." Mr Campbell, junr., told me the other day that the large 30 horse-power engines could take their proper position on the land when the smaller ones were unable to do so. Of course, in manual labour they must be the cheapest, seeing that one engine-driver could manage a 50-horse power engine, whereas five would be required for five of 10-horse power. How very lucky it is that all Mr C.'s land has been drained with pipes at a depth of 4 feet, although I doubt if that will be deep enough when we get the 50-horse power engines. But how readily the water will now pass down to these drains through the stiff soil, after 36 inches of loosening or cultivation; and what additional facilities will thus be afforded for passage of air and manure to the subsoil. Furrows and water-furrows will be unnecessary. The dense undisturbed clay subsoil, trodden for ages by horses, and compressed by the weight of the surface soil, is in a most unfit condition for the passage of root fibres, and we know how difficult it is for even the steam cultivator to break up for the first time this homogeneous mass. The good effect of loosening the subsoil is visible for a great many years. The earth has an especial attraction for the sun's heating rays, so much so that its surface temperature in sunshine is many degrees warmer than the air above it—sometimes as much as 30 to 40 deg. I have observed over fallowed ground, during sunshine, a trembling waving of the air; this is produced by the lower stratum of air in immediate contact with the earth becoming heated and expansively lightened, then it immediately struggles to rise through the cooler and heavier atmosphere. I have noticed the same waving, struggling, upward movement in the air over and around heated stoves, or pipes; we have all observed how rapid is the growth of plants after a heavy thunder shower, falling on the heated soil. This is because water is the great carrier of heat downwards: falling on the superheated top soil, it robs it of some of its heat (just as cold water from a shower-bath robs our warm bodies of their heat), and in passing down to the drains is itself deprived of heat by the colder subsoil, for at 4 deep feet the subsoil is generally as low as about 46 or 48 deg., while the surface may be at 100 to 130 deg. And now becomes obvious the advantage of deep cultivation and drainage, which permit the heated water to circulate freely in the soil and subsoil, and, if in excess, to pass away through the deep drains, deprived of its heat and valuable food constituents. When our stiff clays crack abundantly, and often to the depth of 4 feet, the wheat crop is sure to prosper, the warm air having access to the cold subsoil by the cracks. Subsoils well broken into and rendered friable are accessible to atmospheric embraces which are always fructifying. When these dense compact subsoils thus become more friable and capillary, we might then almost compare them with a piece of loaf-sugar, while previous to this disturbance they were like a lump of lead or putty—the one with, and the other without, those capillary powers which are so valuable. Stiff soils are not so easily exhausted as loose light soils, because although the plant can multiply and push its fibres readily through the loose soil, and suck at many granules, dense tenacious soils oppose a much greater resistance to the passage of root fibres; that is why the necessity exists for loosening them as much as possible by steam-power, and why strong powerful rooted plants, like beans, mangold, and clover, thrive best on such soils. The beans and clover make a way for the wheat fibres, and render the plant food in the soil more available by shading the soil. I have reason to believe that if after cultivating the soil to the depth of 2 or 3 feet, it were amply saturated with town sewage, profitable results would ensue. We should not forget that town sewage has a very much greater specific gravity than water, and that its temperature, which is sufficiently high to dissolve the frost and penetrate the ground in frosty weather, must warm the subsoil. The specific gravity of the liquid manure in my tank is often so great after saturating the solid manure, that the whole of the latter will rise to the surface like a cork, or like a penny piece in quicksilver. It does not answer to let the stiff clays crack before you apply sewage. I will give you an instance of this:—One of my fields of very stiff yellow clay or tile earth (given to crack in drying, and therefore unfit for making bricks), was in Italian rye-grass, and although drained with 1-inch pipes 5 feet deep, and 50 feet from drain to drain, the ground cracked deeply. While my man was, during the summer, irrigating with hose and jet, I was surprised to find the running spring water in the ditch coloured, and smelling of manure. I then examined the mouths of the drain pipes, and found, to my astonishment, that they were discharging a full stream of liquid manure, almost as strong as when applied on the surface. Having since then inspected several farms which are flooded with town sewage, and seeing that in every one of them the water comes from the drains (6 feet deep), as clear as spring-water, I see clearly that it will not do to let clays become dry enough to crack if the sewage or manure is to be made the most of, because, even if solid manure were spread upon such lands when full of cracks, the first heavy thunderstorm would wash some of its best solutions down the cracks and through the drains.

MANURE AND MANURING.

The great lesson taught us for the first time by Baron Liebig is this:—That there are certain indispensable elements of plant food contained naturally in most sorts, viz., potash, phosphate of lime, magnesia, &c., that cannot be sent to the air by burning, nor yet from the air, and therefore if we send them away in the produce which we sell, and omit to bring them back again, that purse will soon be empty. He also tells us that a great portion of these elements, although in the soil, are raw and uncooked, and therefore the plants cannot eat them, until they are prepared, or cooked, by cultivation, by aeration, or by the action of certain chemical substances. He also tells us why farm-yard manure, when made by cake and corn fed animals, is not only good to produce all crops, but acts favourably by preparing and rendering available the uncooked plant

not only in the soil but also in
ubsoil, if we could be induced to
he latter with the manure—which
few will do—because they do not
that they cannot manure the subsoil
h the top soil, for the latter holds it
nd will not part with it except to plant
We have plenty of evidence of this
n the railway cuttings, where we see
ie poor subsoil, under the few inches
soil has not even been coloured by
e. We occasionally hear of the danger
r-manuring; but this I can say for a
ity, that we can never over-manure the
l to the depth of 1 to 3 feet. Thus,
ould not only double or triple our
ld and root crops (for 70 to 100 tons
e grown per acre), but the withdrawal
h heavy crops would still leave the
capable of producing abundant corn
; but, as we cannot manure the bottom
rough the top soil, the latter must be
n or ploughed back, and the manure
corporated directly with the subsoil.
-power will very readily give us access
subsoil by deep furrows. Strong deep-
l crops, fruit trees, &c., feed in the sub-
If that is well filled either with solid or
manure (but not through the top soil)
lants flourish amazingly. For my shrubs
nellias I bore holes 1 yard deep, and pour
them guano and water or liquid man-
nd they prosper accordingly. We are
ning practically to awaken to the great
so forcibly expressed by Liebig thirty-
ears ago. He then warned us of the
r of exhausting the plant food in the
y the exclusive frequent use of nitro-
s or ammoniacal manures. Repeated
ation even of the best Peruvian guano,
is deficient in potash, has, on calcare-
ndy and loose soils, gradually produced
stion; and so it has on pastures, where
crops of hay were at first obtained by
e, or by the use of other stimulating
niacal manures, such as nitrate of soda.
; says:—"The presence in the soil of
cient quantity of potash and silicic acid
ays pre-supposed when guano increases
roduce of corn; and in a soil rich in
potash and magnesia, the application of guano alone ensures a succession of crops of such plants which, like potatoes, require for their growth chiefly potash and magnesia. Meadows and corn fields which give at first large crops with guano, become at last, by the continuous use of this agent, frequently so drained of silicic acid and potash as to lose for many years their original productiveness." A great deal of money which is now wasted might be saved, if we knew a little more about the chemistry or science of agriculture, or if we consulted those who do know. Here is one very striking instance. One farmer uses nitrate of soda and salt, and finds it very profitable; when this news spreads, many more farmers use nitrate of soda and salt, and find no benefit from it. Why is this so? The success of this application depends upon there being in the upper or lower soil a quantity of phosphate of lime that wants dissolving and diffusing. Where this is the case, nitrate of soda succeeds, but where there is no undissolved phosphate it more than fails, for it merely forces a surplus of high-coloured and mildewed straw, to the injury of the kernel. Nitrate of soda and salt possess this advantage, they are not fixed and retained in the surface-soil like ammonia, potash, and phosphate of lime, but are free to circulate through the soil down to the drains, and can therefore dissolve any phosphate of lime that they meet with in the soil and subsoil. A gentleman near Carshalton informs me that for many years he has obtained large corn crops merely using as manure nitrate of soda. His soil, must, I presume, superabound with undissolved phosphate of lime. He has several hundred acres. On some Norfolk farms, where, by cake-feeding and artificial manures, there is much phosphate of lime in the soil, nitrate of soda and salt are found profitable. If we have enough phosphate of lime in an available condition in our soil by Nature or by high cake and corn feeding, superphosphate is not needed, and the money paid for it is wasted, while in soils deficient in phosphate of lime it is "the key of the position." Science explains no end of apparent anomalies which puzzle the farmer, and cause him

heavy loss. For instance, under the ordinary lease restrictions, forbidding the sale of roots, green crops, hay, and straw, there will be in the surface soil a surplus or accumulation of potash. In such cases, guano or superphosphate may be found profitable, but on light and calcareous soils, deficient in potash, the forcing of beetroots, or potatoes, or turnips for sale by means of guano or other manures deficient in potash will prove exhaustive. I hardly ever use straw manure on my light land, because (and here is the point) all the turnips and green crops are consumed where they grow by sheep folded on the land, consuming supplemental food, such as cake, corn, malt-combs, bran, cut hay, and straw chaff. All my straw manure goes to the heavy land, from whence the roots are drawn off. Sugar beet exhausts much potash, therefore sellers of beetroot should use farm-yard manure, for they do not get back the potash in the pulp. Guano would, in their case, soon exhaust the soil of potash. I quite believe that much straw might be sold off certain light land farms, if the roots and green crops are fed off where they grow with cake and corn.

THE MODE OF APPLYING MANURE.

How often we hear that top-dressings of guano, &c., have done little good except for surface or shallow rooted plants. Liebig thus explains it: 2 to 3 inches of surface soil will, if finely pulverized, arrest and fix a top-dressing of guano, so that the lower soil gets little or none of it, and thus, to deep-rooted plants, it is rendered unavailable. This explains why we can only grow clover at long intervals. I always use guano and salt for wheat after beans or after mangold. I sow it broadcast and plough it in. It is very desirable to mix manure with the subsoil for deep-rooted plants. I accomplish this by trench-ploughing, one plough without the beast following in the track of the first plough. Brickdust, or burned subsoil clay, is a certain way of getting profit on our cold, tenacious, birdlime-like tile earth, almost free from calcareous matter. I burned thousands of loads when I first took my farm in hand, and applied about 80 loads an acre to several fields. The land never entirely forgot it, although twenty-eight years have elapsed; but it is desirable to repeat the dressing at intervals. I have continued burning at intervals. My ploughmen often speak of the altered and more friable state of the land. The alkalies contained in these soils are set free by burning, and become food for plants, especially root crops. When the chemist in his laboratory wishes to get all the potash out of clay, he first uses dilute acids, and finally gets the whole of it by burning the clay; in fact, the unavailable is thus converted into the available. An inch deep of clay per acre is about 100 tons; so we may safely burn away our stiff clays, some of them being 150 feet deep. It is summer work. The clay should be sun-dried before burning. Mr Randall, in Worcestershire, burns earth all the year round. It costs me about 1s. per ton on the farm; chalk costs 5s. per ton, including cartage. You may bring up and burn as much of the subsoil as you please; there need be no fear of weeds or wild oats or insects, for the tremendous heat shatters and pulverizes even the stones. Thatch clamps of burned earth, and you will never be short of bedding, in case you wish to sell or economize your straw. The clay must all be well dried before burning, and when once started the red-hot earth will continue to burn that which you gradually add to it (rains, of course, excepted). Burned earth is very much improved as bedding by intermixing with it straw, cut into short lengths, as suggested by Professor Voelcker. It surprises me that so little of this burning is done, for there are thousands of miles of old weedy banks and wretched robber pollards that want roasting, and must be removed if we are to have steam cultivation. Our poor, wretched unproductive fields of twitch and weeds (miscalled permanent pasture), on high-bound clays, would become fertile corn and fodder fields by paring and burning. I had one such piece, which declined to be improved in any other way, so I shallow-ploughed it and burned or roasted the heaps. For twenty odd years it has continued to yield spendid crops eat, beans, oats, tares, roots, clover, This enlightened me as to the national rising to the country by poor pastures e beds of weeds.

PLENTY OF MANURE "GRATIS."

of the most important principles ished by Liebig is the rotation of am- -collecting with ammonia-dispensing —that is, root and green crops alternat- ith cereals—experience has taught us mers this, but we never knew why it o beneficial and necessary. I would ly recommend you to read from p. 315 334 of his "Natural Laws of Hus- y;" for, if possible, it more deeply the profits of farming than any passage of his works. More than half bstance of our crops (ammonia and ic acid) is got from the air, and that is er than having to purchase them at cost. There is a wonderful affinity en the earth and the air, if we permit to come into contact by deep, good, requent cultivation. Poor permanent e is unprofitable, because it deprives nd of the benefits resulting from culti- Three years in pasture are quite nough for certain soils. I never allow more than one year, and never mix ss with it.

ROTATION OF CROPS.

ebig attaches great importance to a on of crops. He clearly explains the iety of and necessity for a rotation of and strong rooted with shallow and s rooted plants, and the alternation of and root or green crops, the latter as tors of a store of ammonia. Is the ourse rotation adapted to modern farm- It no doubt resulted from a general very long course of observation by cal farmers, who, after trying, unsuc- lly and successfully, various modes of ing, adopted the latter, especially after troduction of clover, then turnips, more a century ago. The four-course also utes well the horse and manual labour farm. The rotation is one that agricultural science (had it then existed) would have indicated and suggested—that is, the alternation of broad leaved and narrow-leaved, and deep-feeding and shallow-feeding plants, and of plants requiring the elements of soil and manure in varying qualities, quantities, proportions, and positions. That was at a time when we were emerging from pasture, and when we knew nothing of guano, bones, and other artificial manures, and when there were no oilcakes and other foreign feeding-stuffs, few good roads, and no railways to convey fruit, vegetables, hay, and straw to towns and cities, and to bring back town or artificial manures and feeding stuffs. There are certain evils attending the four-course rotation under the usual lease restrictions. Barley, after turnips fed off with cake, is frequently injured by over-luxuriance, and the young clover destroyed by the laid crop of barley. High farming produces a large quantity of straw. But if, on ordinary farms, there is not even now capital enough to convert all the straw into good manure in open yards, it is evident the greatly increased capital required in live stock (where covered yards are used, and especially where much straw is given as food mixed with cake, corn, roots, malt culms, and bran) could not (with our present agricultural notions) be found. I have £6 per acre usually in live stock only, and even so have much hay and straw to sell.

As regards the rotation of crops the great variety in the proportion of elements that constitute various plants, and their depths and modes of feeding, indicates the undoubted necessity for a rotation or alternation of crops.

CONCLUSIONS.

In conclusion, I am by no means satisfied with the general condition of British agriculture. It must be considered as resting at present on an unsound foundation, for exhaustion of the soil is extensively carried on. The annual produce of 20,000 acres comes into London daily, and daily passes through the sewers into the Thames, instead of returning to fertilize the land. The same suicidal process is going on in most of our other great cities. Common sense tells us what the result of this must be. If the voidances resulting from the vast food imports which we consume annually were economized, our country would be greatly fertilized and enriched. By a false and ignorant delicacy, we look upon human voidances as a horrible nuisance to be got rid of. If we knew and considered that our future food—in fact, our vitality—depended upon the careful utilizing of these voidances, we should take a more rational view of the matter. In this respect the Chinese and Japanese are far before us in common sense and civilization. The late Richard Cobden, in writing [illegible] about agriculture, said:—"I was once vulgar enough to say that a full stomach and a whole pair of breeches were the beginning of all morality and religion." Let us, then, invoke the aid of science in the production of more food, and thus increase agricultural profit. To science we owe most of the comforts of life, such as health, clothing, literature, and locomotion. Why should our food alone be excepted from its influence?

MANURE AND FIELD EXPERIMENTS.

THE following paper on the above important subject was read before the Wigton Farmers' Club, by Mr C. D. Hunter, of Blennerhasset. The lecturer commenced by making some remarks on the value of scientific experiments in agriculture, and after mentioning a few facts about his own experiments continued:—

On seeds, nitrate of soda applied alone in 1868-71, gave, as the average of the four years, 54 stones of hay for every cwt. of manure applied; when used along with superphosphate and muriate of potash it gave 58 stones of hay per cwt. Sulphate of ammonia used alone gave 50 stones of hay per cwt., and in conjunction with mineral manure 48½ stones. Peruvian guano, again, used alone for three years, gave about 8 stones less than sulphate of ammonia for the same period, or equal to 42 stones; and in mixture it gave equal to 30 stones. Nitrate of soda, it will be seen, proved the best nitrogenous manure for hay, and also went farthest when used with a mineral manure. On a clay soil I have only one experiment. The land was in very poor condition; the unmanured crop weighing only about 10 cwt. per acre. On this poor clay, sulphate of ammonia proved superior, giving, when applied alone, a return of 65 stones per cwt. of manure, and with superphosphate and muriate of potash 95 stones.

PERUVIAN GUANO, NITRATE OF SODA, AND SULPHATE OF AMMONIA AS FERTILIZERS.

Nitrate of soda gave, alone, 39 stones of hay, and in mixture 66 per cwt. The experiments on oats are more trustworthy, but having been tried on but one soil and under the unusual conditions of three years on the same land, they must not be regarded as entirely applicable to ordinary farming. From a want of reliable no-manure and mineral-manure plots for comparison, the figures given may be, as a whole, a little too high or too low; but the comparisons between the three manures are quite exact. Applied alone, sulphate of ammonia proved superior for oats; and, taking its return per cwt. of manure at 12 stones of corn, Peruvian guano gave 11, and nitrate of soda nearly 7 stones. Applied in conjunction with mineral manure, nitrate of soda proved superior; and, taking its return per cwt. of 20 stones, sulphate of ammonia gave 18, and Peruvian guano 17 stones. It is rather curious to find nitrate of soda last when used alone, and first when in mixture; further experiments may but confirm this fact, but without further trial I could not undertake to say which was the best manure for oats. One point seems, however, pretty well established, viz., that sulphate of ammonia and Peruvian guano proved of nearly equal value in both cases. The guano used was the Chincha Island of best quality, the supplies of which are now exhausted; but any good guano containing over 6 or 8 per cent. of ammonia will prove a good corn manure. Barley was also experimented with for three years upon the same soil; the same remark applies to this as to oats, viz., that the weight, as a whole, may be a little too high or otherwise, but that the comparisons are just enough. Nitrate of soda here takes a decided lead all through, and, taking its return per cwt. of manure at 20 stones of corn, Peruvian guano gives only 9 stones. Sulphate of ammonia was not tried alone, but in mixture proved superior to Peruvian guano; thus, nitrate of soda, used with mineral manure, gave about 14 stones of corn, sulphate of ammonia 11½ and Peruvian guano about 7 stones per cwt. of nitrogenous manure. This shews nitrate of soda twice as valuable for barley as Peruvian guano, and slightly superior to sulphate of ammonia. On potatoes I have experimented very largely, and have, from over four hundred trials, a number of very valuable facts bearing upon the seed cultivation and manuring for this crop. An average of 6 very reliable plots gives 161 stones of potatoes as the produce per cwt. of sulphate of ammonia, used in conjunction with superphosphate of nitrate of potash; Peruvian guano, in the three years' trial, against this gave equal to 99 stones, and nitrate of soda 39 stones. Some other experiments place nitrate of soda still lower, and two trials with Peruvian guano, used alone, give 84 stones per cwt. of manure, but these are not strictly comparable with the others, being on different soil each year. From the foregoing experiments on nitrogenous manures, it is evident that the value of a manure is affected by the source of its nitrogen as well as by its amount, and that a statement of the raw materials used in making the manure is essential to a correct estimate of its value. An analysis protects the farmer from adulteration, and a composition may protect him from misapplication; thus, if these results hold good on the generality of light soils in Cumberland, it is evident that a potato manure containing nitrate of soda is much inferior to one containing sulphate of ammonia, though both may analyze the same per-centage of nitrogen; 4 per cent. of this being supplied by either 16 per cent. of sulphate of ammonia, or by 26 of nitrate of soda.

PHOSPHATES : POTASH.

The phosphates next demand our attention, as being, after nitrogen, the most important of our manurial substances. Bones, guano, and the mineral phosphates are the principal sources of supply. In the raw state the latter are of course almost valueless ; but in the dissolved state, as bone or mineral superphosphate, their value in the field is the same—and soluble phosphates from bone are of no more value than those from coprolites. Superphosphate of any kind applied alone, is, as a rule, wastefully used. Three experiments give it a value of 6½ stones of hay per cwt. of manure so applied, and as the superphosphate costs about 5s. 6d., and the hay is only valued at 3s. 3d., it is evident that this will not pay. Used in conjunction with muriate of potash and nitrogenous manures it did much better, three experiments giving a value of 17 stones per cwt. of superphosphate. It is noteworthy that in the same series of experiments it was applied to 2 plots along with nitrogenous manure, but without muriate of potash, and its value here at once fell to 10 stones of hay. This shews how one manure helps another, and that on soils deficient in potash a good manure wanting in this element is used at a great disadvantage. Plants require many elements for complete growth, and the superabundance of nine can never make up for the absence of a tenth. For all crops, but more especially the root crops, phosphates are invaluable. Potash, from the prominent figure it makes in the ash analyses of all plants, has always held a high place in agricultural science; but till quite recently its price forbade its use in agricultural practice.

The discovery of potash deposits in Germany was the first circumstance that brought potash manures into general use. In 1867, when I first experimented with potash, I could purchase at £7, 10s. per ton the same article for which I must now pay £12 or £13. Muriate of potash, sulphate of potash, kainit, and crude potash salts are the chief sources of this manure. In 1868-70, I tried the first two on potatoes and clover seeds. Potash salts should not be used alone. Three years' trial of muriate of potash at the rate of 4 cwt. per acre gave it a value of nearly 6 stones of hay per cwt. of manure; two of these years gave it, however, a value of about 8¼ stones. Sulphate of potash gave 15 stones; probably its superiority to. the muriate is due to the fact that sulphuric acid is more essential to plant life than the muriate. On potatoes its superiority is more doubtful, and probably when used with superphosphate, sulphate of ammonia, and other manures containing much sulphuric acid, its superiority would be less evident; further experiments are, however, required to decide this point—the greater abundance and less cost of the muriate also make it more desirable as a manure. Used along with nitrogenous manures and superphosphate, muriate of potash shewed much better results, giving per cwt. of manure 14 stones of hay; this, though not immediately profitable, is so nearly so that in all probability the after effects more than repaid the outlay—and I would recommend that for light land a good grass manure should contain from 10 to 20 per cent. of muriate of potash, equal to from 5 to 10 per cent. of potash. I prefer muriate of potash to kainit or inferior potash salts, because as a rule it contains four times more potash. In 1870, I tested kainit against muriate of potash for potatoes, and from the results on four plots of each, the muriate proved itself about five times more valuable. For potatoes potash has shewn itself indispensable. In two experiments where it was mixed with lime and salt and applied both alone and with farm-yard manure, it gave the first year per cwt. of muriate, 49 stones of potatoes; the second year, 64; and the third year, 104 stones. With farm-yard manure nearly 1¼ cwt. was used, mixed with an equal quantity of salt and 1¼ cwt. of lime; alone, nearly double these quantities were used. Applied in conjunction with superphosphate and sulphate of ammonia it gave over two years an average return in four experiments of over 250 stones of potatoes per cwt. of muriate; this was, however, the second and third years on the same soil, and is thus unusually high. It was tried with superphosphate against superphosphate and salt—4 cwt. of each—for three years in three different fields, and gave 55 stones of potatoes per cwt. of muriate; when added alone to superphosphate it gave only 12 stones, and in one experiment, used alone, it gave 43 stones. From these experiments it is evident that neither for hay nor potatoes should potash be used alone. Plant life is in some respects not unlike animal life, and you might as well expect good health in an animal fed on water alone, or on straw alone, as in a plant fed on but one manure. A good potato manure should always contain from 15 to 25 per cent. of muriate of potash, equal to 7 to 12 per cent. of potash. On carrots, after the failure of 1868, I did not again find time to experiment till last season, when the addition of 2 cwt. of muriate of potash to a mixed manure of superphosphate and sulphate of ammonia, raised the produce nearly 8 tons per acre. On turnips, I have but few reliable experiments, but these go to shew that a good turnip manure should contain some potash, though less is required than for potatoes. For grain crops I cannot recommend potash; in special cases it may be useful, but for general purposes its presence is unnecessary.

MAGNESIA IN CONJUNCTION WITH OTHER MANURES.

Magnesia is also usually present in the ash of plants to a considerable extent, and has often been recommended for hay and potatoes. In repeated trials I have not found its application attended with much benefit. Eight experiments on potatoes give it the low value of 5 lb. of potatoes from 1 cwt. of sulphate of magnesia, that is 6s. worth of manure to produce 2d. worth of potatoes. In these experiments it was used in conjunction with superphosphate, potash, and salt, without any nitrogenous manure; further experiments with nitrogenous manures did not shew any better result. On clover seeds, the balance of six experiments with 2 cwt. per acre of sulphate of magnesia, give it a value per cwt. of 1 stone of hay; it gave the best result—12 stones—when used in conjunction with muriate of potash, common salt, and a little sulphate of ammonia, neither of the first two containing any sulphuric acid; and the poorest result was when added to sulphate of salt and sulphate of ammonia, a mixture containing an abundant supply of sulphuric acid. These facts point to the sulphuric acid of the sulphate of magnesia as the active portion of this manure in these experiments, but neither upon seeds nor potatoes did it pay one-fourth of its cost.

THE APPLICATION OF SALT TO THE SOIL.

Salt is the last manure I shall touch upon. It has been strongly recommended by interested parties, and has doubtless its uses, but as a rule it is more serviceable as a destroyer than as a plant food. Against grub, wireworn, &c., and as a prolonger of vegetation in dry seasons, it is of value, but as a direct manure it more frequently does harm than good. On hay, 4 cwt. per acre applied alone reduced the crop in two experiments, and increased it in two, the balance shewing 8 lb. of hay per cwt. of salt. This seems a common result throughout all England, as thirteen experiments reported by Dr Voelcker shew only 47 lb. of hay for 4 cwt. of salt per acre. The addition of about 2 cwt. of salt to a mixed manure for seeds reduced the produce in seven experiments by more than 2½ cwt. of hay per acre. The balance of testimony is thus against its use as a direct manure for hay. On potatoes, used alone, it seems to have been of service, giving nearly 17 stones of potatoes per cwt. of salt, but when added to a really profitable manure like superphosphate, it almost invariably reduced the crop. It is rather an interesting fact that, though often found in the ash of plants as soda, it is sometimes absent, and for some plants its presence is not necessary to a healthy growth. These are the most salient features of our four years of field experimenting on manures at Blennerhasset. The details of many of the experiments are very interesting, and to put them in a practical form, I will give the composition of several manures:—

	Nitrate of Soda.	Sulphate of Am.	Superphos.	Muriate of Potash.	Total.
Per Acre.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
Hay......	1½	—	3½	1	6
Oats......	1½	1½	3	—	4½
Barley ...	1½	—	3	—	4½
Potatoes.	—	2½	6½	3	12
Turnips..	—	1	3	1	5

The Garden.

AMONG THE LILIES.

THE numbers of the Lily race that have been collected and introduced into this country from time to time, if gathered together in one establishment, and grown in anything like satisfactory condition, would be worth a day's journey to see. Like many other beautiful plants, some of them have been forgotten, many of them but indifferently cultivated, and the few that have never been forgotten, not so well managed by the multitude as they might be. Many of them are cultivated in pots, and kept in a temperature that they very much dislike, while some others that thrive best partially protected, are oft unnecessarily exposed.

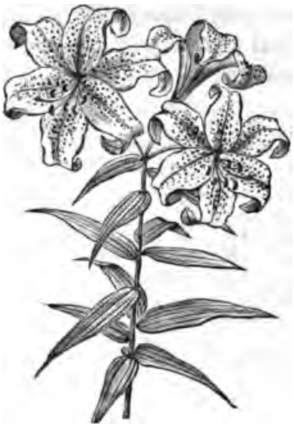


Fig. 1.—Lilium auratum.

The beautiful golden-rayed Lily of Japan (L. auratum), is of a tolerably hardy disposition, but in general it is best grown under a protector of some kind, in pots. Our season is often untoward in April and May, and the bulbs that would bear our winter's frost are retarded in growth by the incidence of cold weather in the months spoken of. The consequence is, the season is advanced before the flower-buds expand, and the early autumnal frosts may have overtaken them ere their floral beauty is developed. It is better, therefore, to encourage spring growth, and protect the young plant as it ascends, so that the crop of flowers may be matured early, to delight the eyes of all who look upon them. Scarcely any notion can be formed of the floriferous character of L. auratum, from the annexed representation,, fig. 1. It yields spikes sometimes branched, bearing scores of flowers. The great variety, too, that is to be had from imported bulbs and from seedlings raised in this country, invest the species with additional features of attraction.

Under the same category of cultivation may be ranked the Lancifolium section of Lilies. It, too, is a Japanese bulb, varied in colour, as is the golden-rayed Lily. We ought rather to have said, more varied, for as yet we have no variety of the auratum so white as we have of the Lancifolium Lily. Both the white and the darker ground sorts are grown in quanties over the country, and most excellent decorative plants they make. They require protection during winter and in spring, but should have abundance of ventilation after May, until they produce their flowers. The most desirable of all the forms of L. lancifolium to possess is L. speciosum. It is broader generally in the segments, more densely coloured at the orifice out of which the stamens and pistil spring, and the spotting is more decided and more vivid than in any other of the varieties. The annexed, fig. 2, gives a very good idea of the form and general character of the flower.

Lilium longiflorum (candidum) is a beautiful white-flowered species, which has a wide geographical distribution. It should never vn in-doors, as it dislikes artificial heat ı artificial climate. It may live and ı such a climate in a way, but it will ıver. The best way to manage it is t it in what we would call a Lily bed, ɔject to be disturbed by the spade, and :epared as to drainage and soil. In ɔth it and its varieties—Takesimba and will do well, and flower generally in : and September. The annexed, fig. s some idea of the habit and inflores- ɔf the plant. It is not so prolific of as some others, but the pure white and the wax-like substance of the invite admiration. No one should be t this spotlessly white Lily.

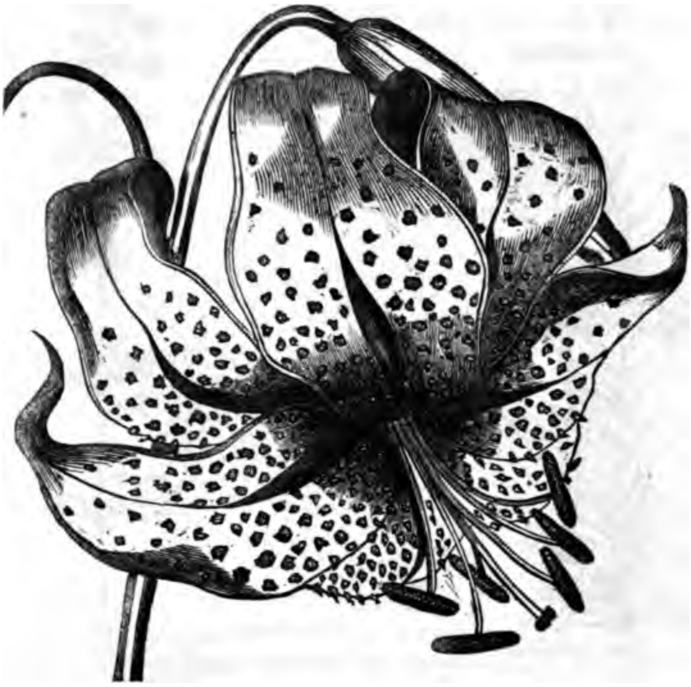


Fig. 2.—Lilium lancifolium speciosum.

.m colchicum (Szovitzianum) is an ad- : habited Lily, suitable for out-door . It is one of the dense habited , with its leaves arranged closely to- round the stem, in some respects like ɔrum, but even better clothed. It grows ı good ordinary soil, and flowers in rs rather sparingly, but the habit of the plant, and the interesting character of the flowers, are sufficient to command for it much patronage. The flowers are of the palest yellow or sulphur hue, and are indefinitely spotted over with roseate purple. The drooping tendency (see fig. 4) of the flowers rather enhances than detracts from the appearance of an individual plant in a state of inflorescence.

Lilium Thunbergianum is one of the most distinct and best of hardy-growing Japanese Lilies. Fig. 5 gives some idea of its habit; its oblong leaves somewhat clasping the stem, and its crowd of flowers coming out in numbers at the leafy extremity of the spike. What is of considerable moment, the colour of the flower approaches to a vivid crimson, and the segments are pretty evenly formed. The double-flowered one now in commerce is an acquisition, because of its persistency on the plant, and its adaptability for in-door decoration.

Lilium Martagon is a European Lily, pretty widely distributed. It is perfectly hardy in our gardens, and like many more of its fellows should not be often disturbed in the flower border. As will be seen from the illustration given (fig. 6), it is differently habited from other Lilies, in having tiers or whorls of leaves arranged up the stem. It is somewhat a free-grower in ordinary soil. In its native Siberian home, it seems to multiply to a considerable extent, the natives digging up and eating its tubers. It grows to about 4 feet high, and produces numerous Turk's-cap-like flowers, of a light purple colour, shaded out towards the extremity of the rolled-up segments; it is a desirable border flower, propagated either from seeds or from the scales of the bulb or tubers.

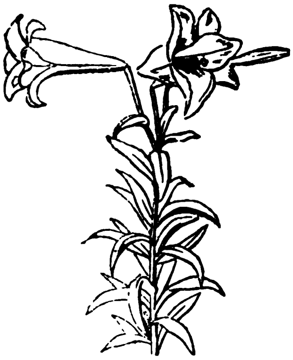


Fig. 3.—Lilium longiflorum.

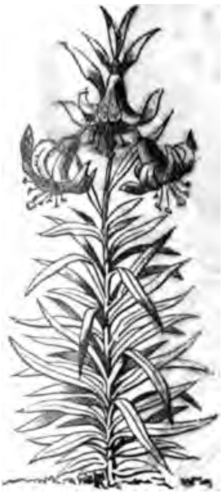


Fig. 4.—Lilium colchicum.

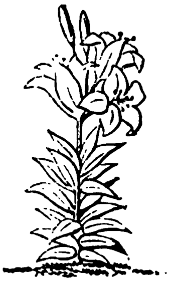


Fig. 5.—Lilium Thunbergianum.

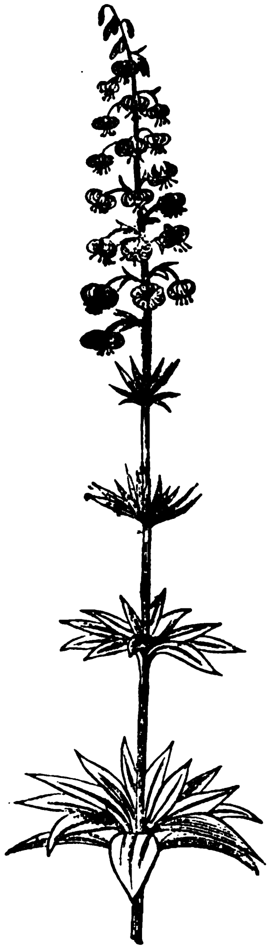


Fig. 6.—Lilium Martagon.

Lilium superbum is one of a very desirable kind to introduce into the flower border or the bed of Lilies. It is the tallest grower of such as we recommend for out-door culture, and is hardy in general localities. It is an American Lily, and has a pretty wide geographical distribution. The habit of the plant is good, the leaves, although small, numerous, crowding somewhat together e base of the stem, and getting less less in number, in a given distance rds the flowers. The flower, too, is he Turk's cap form, of a quiet shade range, and spotted. The spots are black telling character, as the ening of the larger sized flower distinctly rs—indeed, the top portion of a spike is represented in miniature by fig. 7.

ilium Catesbæi is an American Lily of ry character. It is one of the dwarfest ers we have, seldom exceeding 1 foot in ht. The flower stem proceeds from the rn of the bulb, and is somewhat sparsely red with leaves. The flower is erect at extremity of the stem, as shewn in fig. nd its six segments arch outwards somet gracefully, springing from the base of erect stamens.

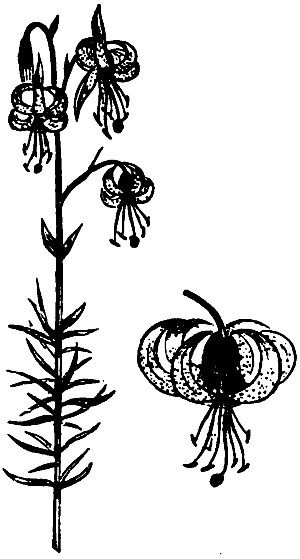


Fig. 7. –Lilium superbum.

he whole of these Lilies can be propa- d by division of the bulbs; by breaking he scales with the finger and thumb, and rting them in a sandy soil until they make s, and by seed. What the grower has to nore than careful about, as we have incidentally observed already, that the bulbs be not lacerated or disturbed by the spade in the spring dressing of the borders. Every bulbous root should have a label or tally, to tell of its whereabouts, else the most careful will be sure to do damage in the operation of spring dressing.

We should much like to see greater interest taken in Lily cultivation. They are, indeed, in their numerous varieties, beautiful objects. Many have been deterred from extending their acquaintance with them, owing to the difficulty in getting them from houses that offer them true to name. It is most important that the seller should see to this, as it would increase his business, and give a greater stimulus to the cultivation of this extensive family. Steudel enumerates fifty species in 1840, besides some one hundred and twenty varieties. Since that day we have had several important additions; and it may be remarked, that several were then known are lost to the country, mainly through improper attention to the kind of teatment each species requires.

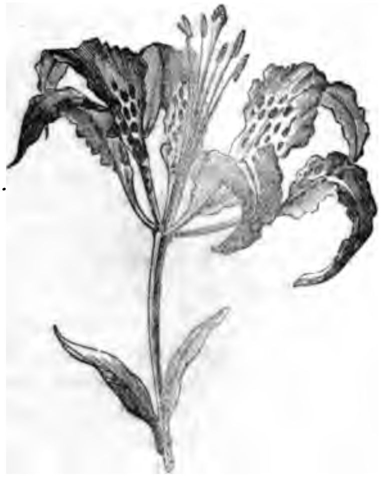


Fig. 8.—Lilium Catesbæi.

It remains for us to add, that we are indebted for the illustrations to Messrs Hooper & Co., Covent Garden.

MIGNONETTE AND ITS VARIETIES.

WHO that loves a garden does not know something about Mignonette? The rich odours that it disperses at dewy eve ensure for it a place of preference in the select list of plants of all amateur gardeners. The regard for the plant is not confined to our own island; it is the loved one of our American cousins, the "Frenchman's darling," and all the civilized world's favourite that take to the cultivation of flowers—all that have a few square yards of ground—sow a pinch of seed of Mignonette. It is patient under cold, under mildness, and under high heat. Give it the free atmosphere of heaven, and the heat of the tropical sun, if it be provided with copious moisture, even such a fierce glare will not lay it low. It is not to be courted for its gaiety, but its perfume wafted before the breeze at sunrise and sunset, gains for it thousands of admirers. In our own country, and in similar climates, it is selected to serve various ends. It is sown, in a general way, out-of-doors, sometimes to tone down the glaring colours of other associates, for its flowers are flowers of what might be called of lowly pretensions, which often are passed by the indiscriminate multitude, forgetting that a bountiful Creator formed—

> Not a flower
> But shews some touch in freckle, streak, or stain,
> Of His unrivalled pencil.

Again, Mignonette is selected for the decoration of windows—dining-room, drawing-room, and bedroom windows, and charming it is when the balmy odours flow in when the windows are raised on a summer morning, with a view to change or oxygenize the atmosphere. There is no plant that is better adapted for growing outside the windows, in the window-boxes of various designs that are made to fill up the sill. It is chaste and graceful, and becomes any position about the exterior of a building—be it mansion, villa, or cottage.

One word of caution before we enter upon discussing its merits as a specimen plant. All those who have boxes sown with Mignonette should thin out the seedlings to a distance of from 4 to 6 inches between plant and plant, in order to ensure the life and health of the remainder. If they are allowed to come up too closely, they die away in irregular patches, and the chances are that the success which is looked for generally ends in blank disappointment. The Mignonette plant is a deep-rooting one, and the little fibrils soon make their way to the wooden pan. There they must take a different direction; the interference does not seem to accord well with their disposition, and the check is often too great for the security of their life. Deep boxes are, consequently, much better than shallow ones for Mignonette culture, and we would desire to see this point better attended to. Many give up the window culture of Mignonette because of unsatisfactory results. The secret of want of success lies more in shallow boxes than all the other inattentive regard to wants put together.

There is another caution that we have to ventilate to buyers of seed, and that is, see that good giant varieties are selected. Miniature stocks or rather seeds from miniature stocks, are not desirable for window culture. The stronger the "brand" of seed, the better the results in box culture. This caution, and the caution with reference to shallow boxes, comprise the most considerable for the villa gardeners to note. One other remark—see that the boxes never get a drying. Watering by fits and starts has a tendency to weaken, if not altogether to destroy, the constitution of the plant.

Mignonette has been employed for another very important office in garden decoration, and that is as an individual in conservatories and greenhouses. This is the most modern of the duties prescribed for it. And well, o, does it do its part in that way. It has be submitted to a process of training hich requires more than ordinary skill, nd so we have exhibitions of it in various egrees. We have Mignonette ill-cultivated, s may occasionally be seen by the untidy, nky specimens which scarcely deserve the ame; and we have it respectably cultivated, somuch as it forms a suitable companion the miscellaneous character of the plants ssociated with it. It can be seen by the tored eye with complaisance, and passed y without incurring hostile criticism. We ave also Mignonette cultivated by the hand f a master, and such are the various speci- ens reproduced in the engravings sup- ied to us by Dick Radclyffe & Co. Soft- oded plants are easy to cultivate, say the owing ones, and so many of them are. ny one can grow a scarlet Pelargonium to e size of a clothes basket, without any eat skill, provided there be the means of ntering the plants in a proper tempera- re. Caladiums, and Begonias, and Co- ses may be produced in specimen size, nost, some would think, by magical influ- ce, so quickly do they extend. Mignon- e, however, requires, if not more time deed, it can be done fully as speedily as any of the subjects quoted) to perfect the specimen, at least more care, more skill. To look at the tiny, whity-grey seed before you commit it to the earth, and expect that a twelvemonth's cultivation will make it a plant of the dimensions of any of the samples engraved, seems, indeed, an improbability; and yet it is not only possible, but the thing has been done over and over again. There is no one but will unhesitatingly vote that the production is a feat of cultural skill. It is, by the way, more of a prodigy of culture, than altogether a useful way of filling the tables of a conservatory. Lesser-sized plants will, in general, give ample satisfaction, and leave space to be occupied by the favourites. We must not support the principle of a steady, uncompromising admiration, or love for one beauteous or favourite race, however beautiful or however winning, from other qualities. We must divert the thoughts of the amateur to a divided love for the beautiful, which are as numerous throughout the universe as the grains of sand on the sea-shore are countless, and out of which there are abundance to gratify all tastes.

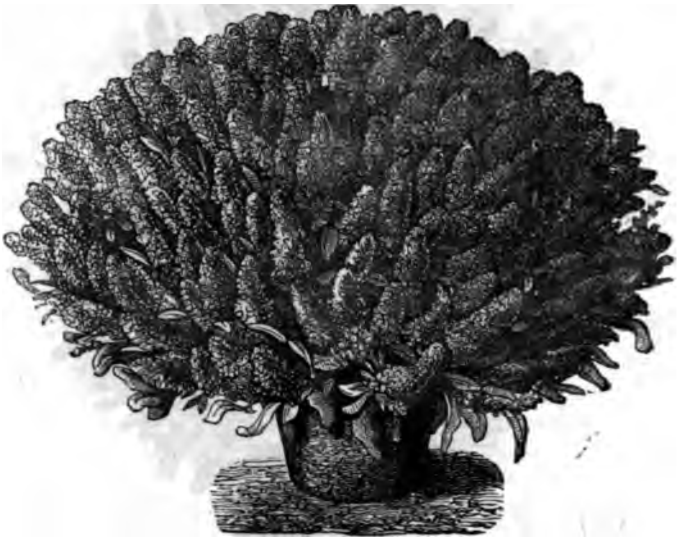


Fig. 1.—New Dwarf Compact Mignonette.

Granting all this, the specimens pourtrayed shew more to the experienced eye than mere dimensions, they point to a well selected stock. And this is one of the main points in which a reader should be interested. Many, at a first glance, will say:—

"Mignonette bushes like these! Are you really in sober earnest in recommending these to our notice? The very sight of them will deter us from making an effort, however anxious we might be!"

Just so; we do not expect villa gardeners, with limited accommodation, to become experts in culture without the means; and therefore, while we hold out these as shewing the high steps of the ladder to be climbed, we scarcely expect to see very many reach the top. The way, however, to get the greatest satisfaction from the seed sown is to be sure that it is of the kind wanted.

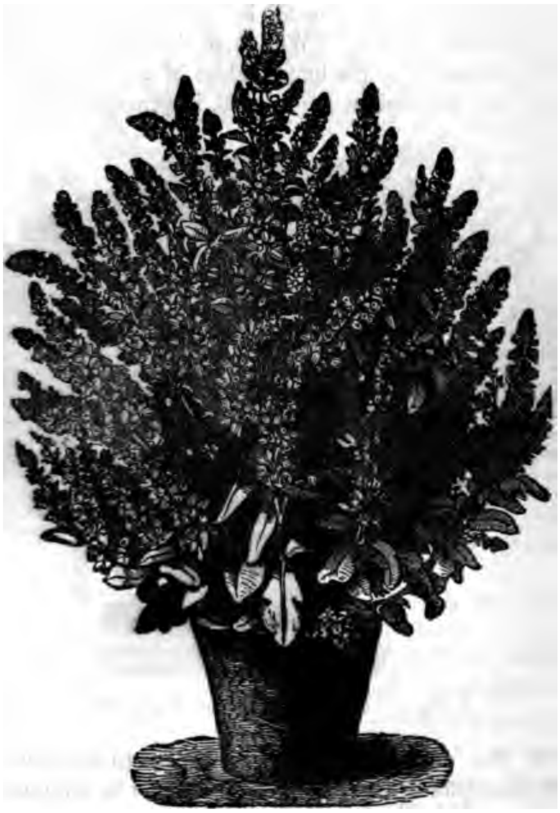


Fig. 2.—Tall Pyramidal Compact Mignonette (Reseda gigantea pyramidalis).

We have here three different forms of the same individual. Fig. 1 is a representation of the New Dwarf Mignonette, which is a selected stock of the Egyptian Mignonette—the Reseda odorata of botanists. It has a compact, dense habit—so dense and compact, indeed, that there is difficulty in getting it staked out sufficiently to make a proper specimen. It will be found useful for a marginal line in the front of a vinery border, or in any place where it has room to extend. It is useful for decorative gardening generally, and we have had it in good specimens over and over again. For the bush style of pot culture, it is the best variety to fix upon. It has large Larkspur-like spikes of bloom, and is generally well covered with foliage. The numbers of the individual flowers in the spike, and the reddish-coloured anthers, give it more than normally a stylish appearance.

Fig. 2 shews the Tall Pyramidal Mignonette. It is a strong-growing strain of the type, and is good for general purposes. ould commend plants of this variety to own of some size in pots, then planted ndividually in the centres or in salient s of the flower garden designs. Properly orted they would be effective to the eye, yield the pleasing odour to please the of smell as well as the sense of sight. a variety as this would grow rapidly, and a good stem for cultivating what is called Mignonette. This is got by training central stem to a stake, and pinching the als to encourage the leader. It does do to pinch off leaves, or pinch too closely laterals, as they are aids in the manufac- of roots, and otherwise strengthen the ving plant.

ig. 3 shews to advantage the Pyramidal quet Mignonette. It is of a somewhat e and easier habit than the Dwarf Mignonette, and grows vigorously. It requires more support, in the shape of staking, than the one to which it is compared. In exposed places this sort is not so good, as it is apt to get blown about. We have always found this form to be one of the best for free culture; it grows readily, and its flowers, although looser on the spike, stand out well.

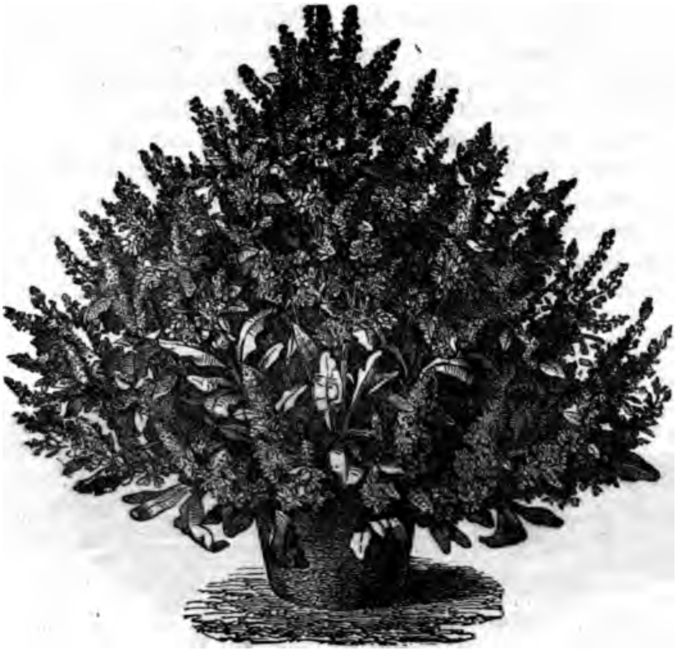


Fig. 3.—Pyramidal Bouquet Mignonette (Reseda pyramidal bouquet).

For ordinary sowing in the garden ground it is not yet too late to put in seeds. It is better, however, to be abreast of the season, and have seed sown early, say in February or March, and a selection of the plants in pots ready for transference when weather is favourable. Much the best crop of bloom is reaped in this way. For cultivation in pots, seeds sown in August yield a crop of seedlings that, properly encouraged and trained, will furnish flowers from May till October.

GREENHOUSE VENTILATION.

IT has been remarked that our forefathers were a grave, whiskered race, but tasteless, and when we look back to much that has been done in their lifetime, the accusation is not without point. But we must, on the other hand, admit that the times of our forefathers were altogether different; they thought quietly, acted quietly, and lived quietly. Business came to hand without push, and its behests were fulfilled with the same listless apathy. Now, the force of circumstances compels men to think rapidly and to act rapidly, else some rival will snatch the coveted prize out of their grasp. We live in an age of telegraphy, which quickens the activity and the resources of men. There are more mouths to fill, and there is, happily, the wherewith to fill them. Successful application and judicious measures bring with them wealth, and as wealth comes, so does taste increase. All, certainly, cannot worship at the shrine of "fortune's velvet altar," but there are not a few who can give way to the wishes of those who are near and dear to them. Houses of glass were too brittle for the sober-going middle class of the early part of the century we live in; now, every well-to-do citizen has his greenhouse, for who "loves a garden loves a greenhouse, too," and time is fast approaching when the intelligent and successful working man may have this bit of luxury to his country cottage or villa.

What we submit now for illustrative purposes is beyond the reach of these latter classes we spoke of; but it is not beyond the reach of many of our villa gardeners. It is well at times to bring such subjects before their notice, as it gives them some idea of what is doing in that particular line.

We submit a tasteful, although plain range of glasshouses, fig. 1, manufactured by Mr T. Messenger, of Loughborough. It consists of a central house, which may be filled with ornamental and flowering plants, and be very good for the purpose too. Climbers could be led up the rafters, such as Lapagerias, Bignonias, Passion flowers, &c., and have a fine effect. The central bed could be reserved for Palms, Dracænas, Tree Ferns, and tall greenhouse plants; while the front shelving will come in useful for the gay and the ornamental among the lesser statured plants. The houses on either side will make excellent vineries or Peach houses, there being ample length of rafter to command a yield of fruit satisfying to the grower.

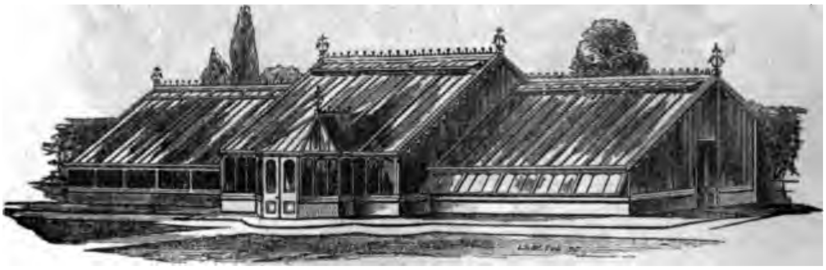


Fig. 1.—Range of Glasshouses.

What, however, we wish to point out more particularly in Mr Messenger's designs, is the ample means provided for ventilation. That item of hothouse accommodation to plants is not too well considered. During summer we can scarcely have too liberal ventilation; it keeps the plants consolidated in their ligneous parts; and those possessing leaves of a soft flimsy texture need abundance of air and light. The gardener or attendant must take care that the tender plant is preserved from sunstroke.

As will be seen by fig. 2, the curviinear house is so constructed that each glass division, lengthways, is fitted to the cross rafters with hinges, and by means of an apparatus connected to the arm-like ittings, the sashes are moved outwards, thus giving either an inch or an ell as may be desired. The whole area for plant growth indoors may be exposed to all but out-door exposure. You have therefore the convenience of protection when wanted, and the benefits of a thorough ventilation. We commend its structural details to the consideration of all those about to embark in hothouse building.

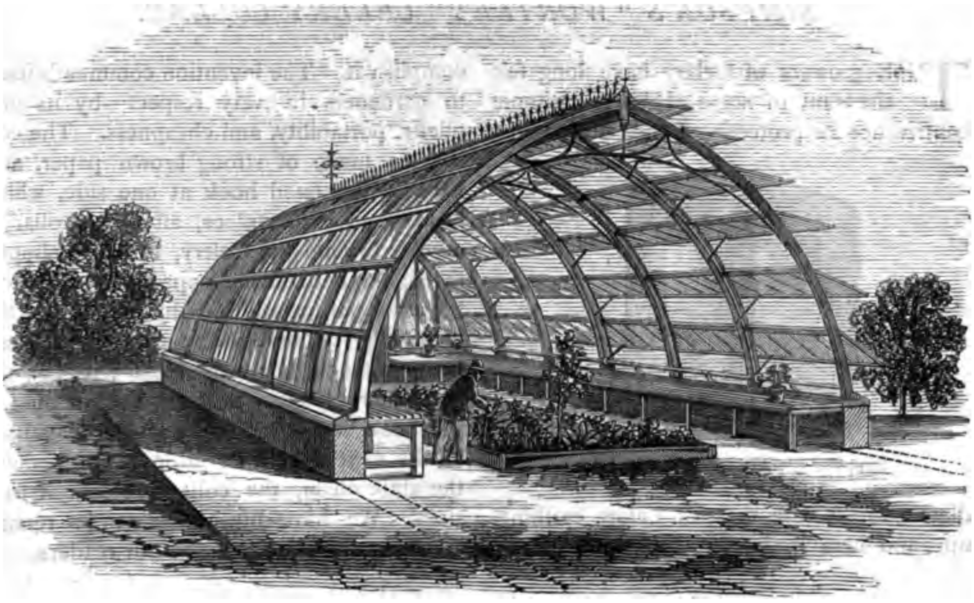


Fig. 2.— Patent Curvilinear Conservatory.

The manufacturer thus speaks of the construction and ventilation of his houses :—

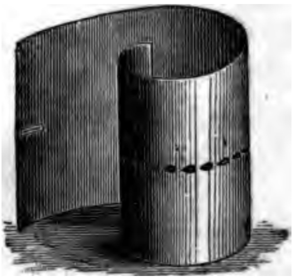
"Strength is gained by using iron uprights, combined with tension rods under each rafter, to support the roof, the uprights resting upon either iron, stone, or wood sills; or the sills can be entirely dispensed with by using slate uprights instead of brick walls. Lightness is obtained by building on the tension principle, the strongest rafters required being only 3 or 4 inches by 2 inches, which are placed at intervals of about 4 feet, ordinary sash bars coming between them. Durability is increased by using timbers of light scantling, and so arranging them that there is no possibility of moisture settling in crevices between the various pieces of timber: thus rendering the structures practically imperishable, particularly if a stone sill be used. This precaution, and the making every portion of the surface accessible for painting, is the greatest preventive of decay. It will be seen that by this arrangement the entire structure is bound into one, and the whole supported by a framework of iron.

"The advantages of the ventilating apparatus are the following :—Thorough and complete ventilation; convenience, as the apparatus can readily be fixed in any part of the building; the formation of beds and arrangement of plants need not be considered, neither being interfered with nor injured in ventilating; economy, there being no possibility of a light falling and breaking glass; much time is also saved. The ventilators are so arranged as to exclude rain when open. It is usual to make the ventilating lights the entire length of the house or compartment of range; but if it be desired to open any particular part separately, it can be so arranged.

"In addition to the gracefulness of the outline of the patented curvilinear conservatory, it has the advantage of being entirely constructed of ventilating lights, so arranged that the whole of the lights forming either side of the house can be opened to any degree by one action. This arrangement allows of thorough ventilation, and in effect places the plant in the open air, while retaining all the protection and advantage of a glass house. This principle of building can be applied to houses of every form with equal advantage, for whatever purpose they may be required. Should it not be required to open all the lights forming the roof, any that may be preferred can be opened, the others being made fast. No bent glass is used, saving much expense both in first cost and repairs afterwards."

SIMPSON'S "WORTLEY" CELERY COLLAR.

THE growers of Celery have long felt the want of some cheap and simple contrivance for protecting Celery from immediate contact with the soil before earthing-up—and here is the very thing that will accomplish it. The invention commends itself to gardeners in every respect—by its simplicity, portability, and cheapness. The collars are made of strong brown paper, and have a japanned hook at one side, which is fastened in its place, after the collar is adjusted round the Celery, by being slipped through a hole on the opposite side, as will be more particularly seen by referring to the engraving. These holes extend for some little distance round the collar; and as the plant increases in thickness, the pressure of the hook breaks the paper and adjusts itself to the next hole. In addition to keeping the stalk clean, the collar protects it from slugs. We have no hesitation in recommending the contrivance to our readers.



Simpson's "Wortley" Celery Collar.

NEW AND RARE PLANTS.

BRITISH QUEEN PEAR (Ingram).

A DELICIOUS new Pear (fig. 1), raised by the late Mr Ingram when r Majesty's gardener at Frogmore, and rthy the name it bears. At the Dublin International Show it obtained the first prize for the best dish of dessert Pears, any kind; wherever exhibited it has always maintained its pre-eminence by being awarded the first prize. The fruit is large at times,

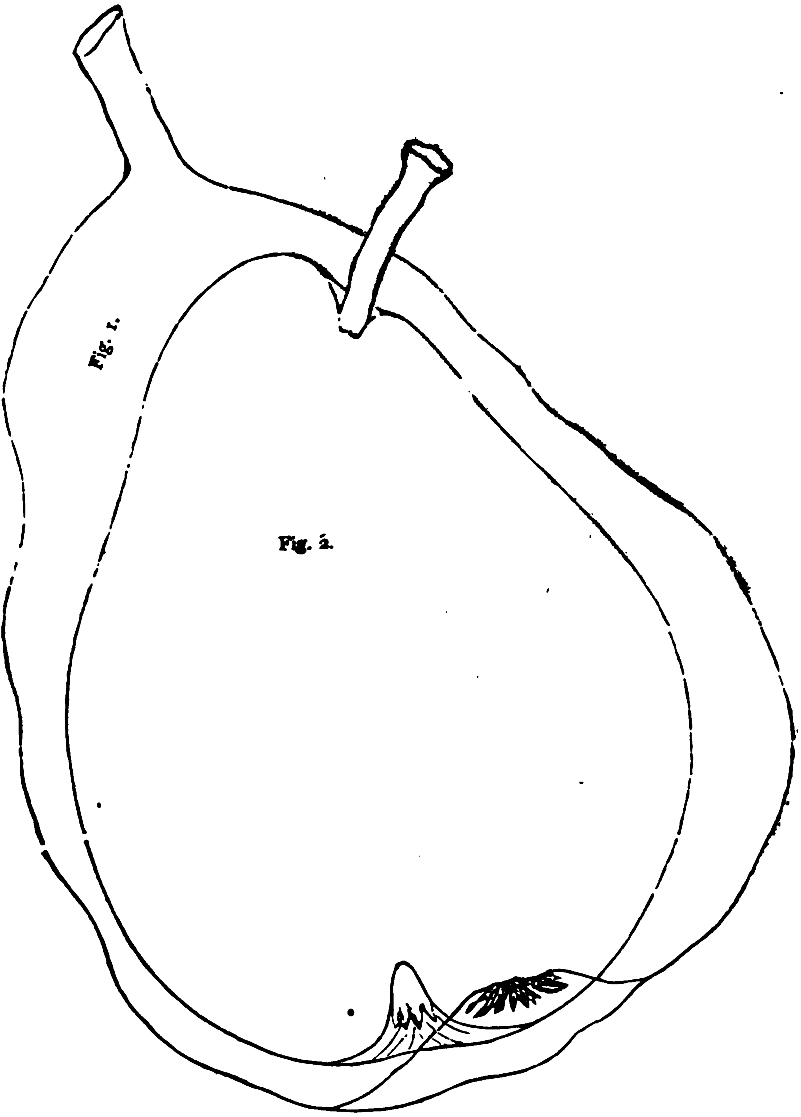


Fig. 1.—British Queen Pear. Fig. 2.—Pitmaston Duchesse d'Angouleme Pear.

and very handsome; flesh creamy yellow and melting, with an abundance of juice, which is saccharine and rich, with a fine aromatic flavour.

PITMASTON DUCHESSE D'ANGOULEME PEAR
(Williams).

This fine new seedling Pear (fig. 2) was raised at Pitmaston. It has been grown 21 ounces in weight, and is one of the largest melting Pears, and altogether a good variety. The outline is uneven, and often varies in shape; skin yellow, spread with grey specks and patches of russet. In this respect it much resembles Williams's Bon Chretien. The flesh is white and melting, with an abundance of refreshing juice, and of good quality.

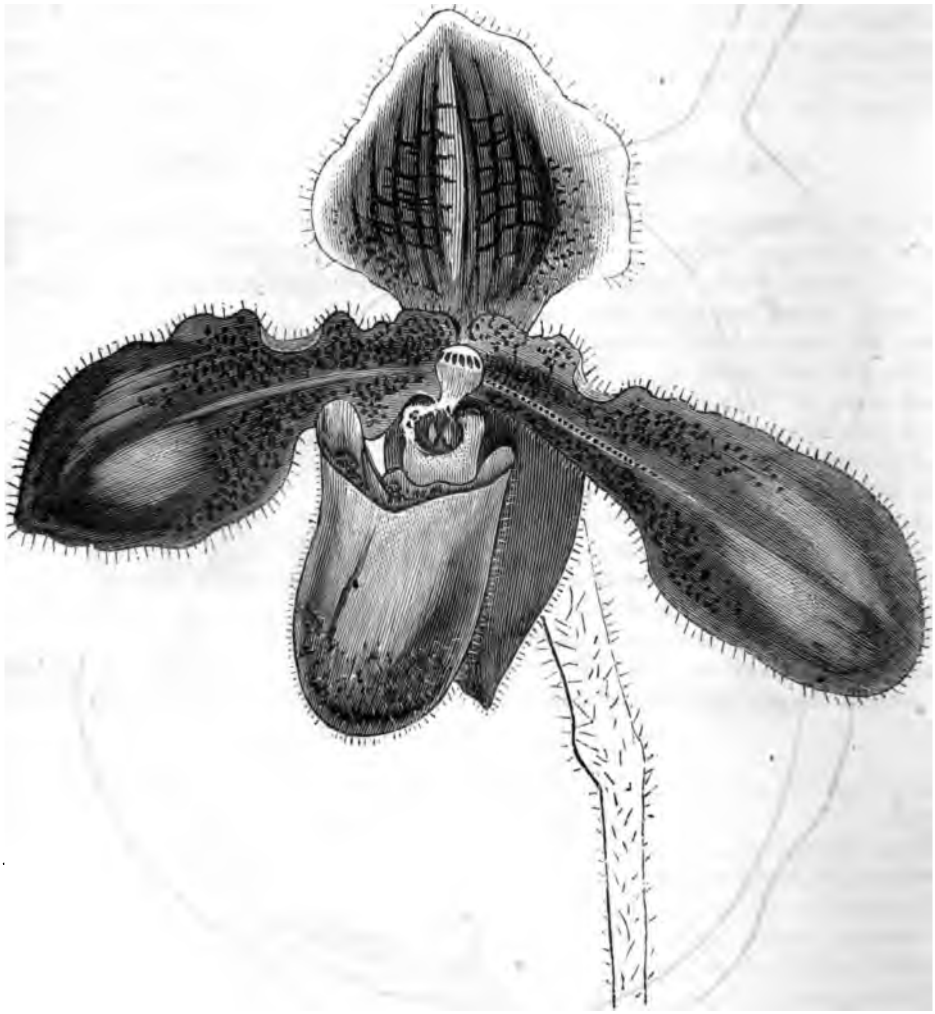


Fig. 3.--Cypripedium hirsutissimum (Lindley).

CYPRIPEDIUM HIRSUTISSIMUM (Lindley).

This species was published by Hooker in the *Botanical Magazine*, from Dr Lindley's M.S. He remarks that "it is an extremely handsome species of the stemless group of Cypripepdiums, allied to C. insigne, villosum, Lowii, and barbatum;" and he quotes

Lindley's exposition of the differences 'een them. "C. insigne is only tomen- , and its petals want the spathulate form, ; hairs, and strong undulation. C. villosum longer flowers, no undulation or beard or tion of the petals, [and has the] sterile ıen truncate, not quadrate. Of C. Lowii, long flat naked petals are quite different. barbatum has a circular, not quadrate, ile stamen, spotted short leaves, and wants shagginess. In C. purpuratum the sterile ıen is lunate," &c. Hooker adds that the ›urs, which are of various shades of purple green, are brighter, richer, and more .ing than those of any other species known im.

cape, bract, ovary, and whole back of the 'er shaggy, with long hairs. Dorsal sepal, ‹ purplish green, striated, quite green at margin. Petals purple, the base green tled and dotted with purple, undulated ıe margin. Lip deep green, with a tinge urple. Column and sterile stamen varie- d with green and white, and spotted with : purple. A native of Java, and first ered in this country in 1858.

nce the above date it has been grown flowered in most Orchid collections of the country. It is one of the most strikingly ornamental of its compeers; the long shaggy purplish hairs in the margins of sepals and petals are of the most striking character. It grows well in the compost we have recommended for Cypripediums, and should always have a brisk heat, and a general good supply of water at the root.

ASPLENIUM ALATUM.

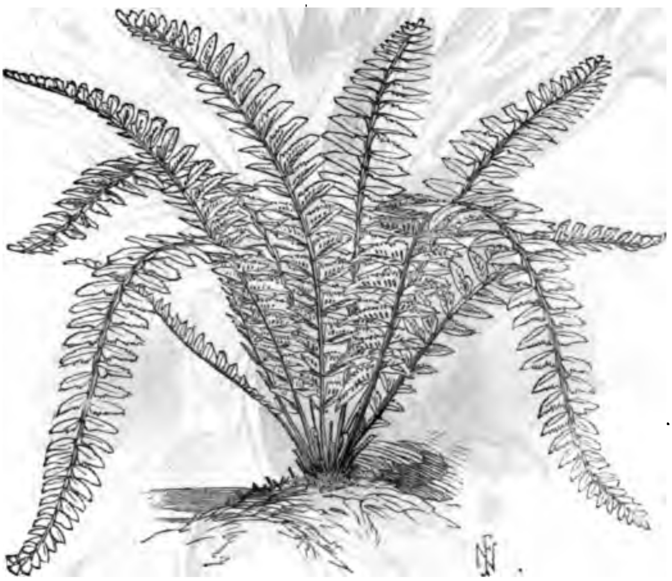


Fig. 4.—Asplenium alatum.

This is at once a very ornamental species, and a plant of easy culture. It is a native of warm parts of South America, but succeeds admirably in a somewhat cool stove, and, if desired, will suffer removal from the plant-house to the dwelling apartments, for the decoration of drawing-room or boudoir, without the slightest injury, providing always that there are no young immature fronds upon the plant, and that gas is not used in the rooms to any great extent. The fronds of this species usually attain a length of from 12 to 18 inches; erect when young, but becoming drooping and beautifully arched with age. In its normal state the fronds are pinnate, but we have specimens in our herbarium in which some of the pinnæ have bec again divided, giving an illustration of an attempt to become bipinnate.

Asplenium alatum should be potted in a compost consisting of two parts peat, one of loam, and sufficient sharp silver or river sand to make the whole feel gritty when taken in the hand. The pot should be well drained, and a liberal share of water given, both from watering-pot and syringe. For the illustration of this beautiful plant we are indebted to Mr B. S. Williams, of the Victoria Nursery, Upper Holloway, whose useful book upon this order of plants is now so widely known.

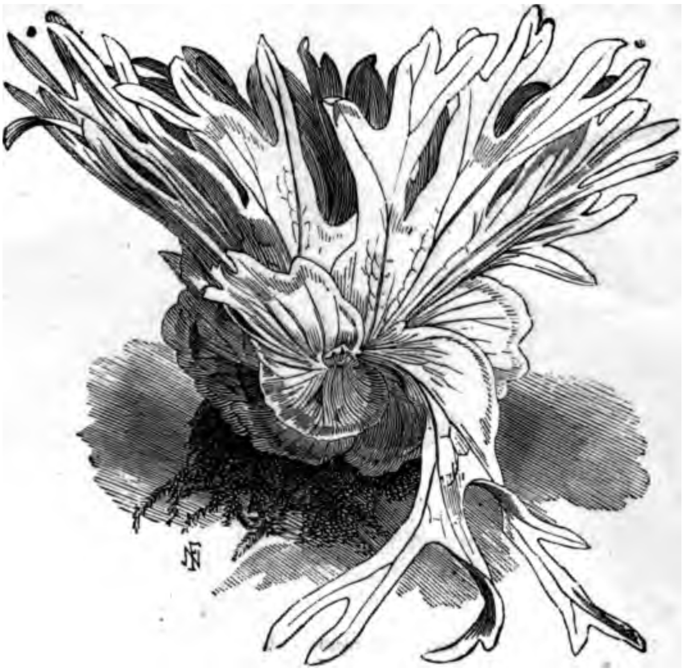


Fig. 5.—Platycerium grande.

PLATYCERIUM GRANDE.

The accompanying illustration (fig. 5) is from Mr B. S. Williams's work, entitled "Select Ferns and Lycopods, British and Exotic," and faithfully pourtrays the appearance of the plant when grown upon a block of wood, and placed upon a shelf or bracket in the fernery. The plants belonging to this genus are popularly known as Stag's-horn Ferns, and are frequently called Acrostichums, but they differ materially from the true type of that genus. The number of species belonging to the genus Platycerium are very few, but all are characterized by their heteromorphous fronds, which are of a coriaceous or leathery texture, and these are clothed with peculiar stellate hairs. The fact of the present species being a native of the Australian continent, as well as the Malayan Islands, would lead the cultivator to infer that the plant required the temperature of a cool house; but our experience of it has not confirmed such an inference; for, to grow it with success, we have always found it required stove heat. The barren fronds of Platycerium grande are very persistent, and, indeed, form the greatest beauty of the plant: they attain to some 2 or more feet in diameter, nearly round at the base, and, as will be seen by a glance at our figure, more or less forked upon the upper sides. The fertile fronds are dichotomously forked, and bear the sori in large amorphous patches upon the under side.

Naturally these plants grow as epiphytes upon the branches of trees; and, independent of this being the most natural way to grow them, it is extremely difficult to grow the plant now under consideration in a pot. Neither under pot culture would it have such a *recherché* effect as when grown upon a stout block of wood.

If a young plant is obtained, the best way to treat it is to attach it to a block with copper wire, and place some sphagnum Moss about its roots, adding a little occasionally as the plant increases in size, or as the seeming requirements of the plant dictate. It may be hung up in the stove or placed on a bracket, and should be frequently syringed with clean water, as well as being treated liberally to the roots, from the watering-pot.

Arboriculture.

JAPANESE CONIFERÆ.

[The following notes, from Messrs VEITCH, of Chelsea, on the growth of these recent additions to our British Pinetums, will be found generally interesting. Our experience of them, so far as we can speak, looking to their recent introduction, is more than favourable. They are all splendid objects for every garden.]

ABIES ALCOCKIANA, 3 feet high.—A slow-growing Fir, with longer leaves than the ordinary Spruce, and lighter-coloured foliage; very hardy, close, compact; upright growth of about 6 inches.

Abies firma, 7 feet high, should be planted upon elevated ground, as it is otherwise subject to being injured by late spring frost. A fine distinct tree of good shape; growth in the way of Picea Nordmanniana, with toothed leaves; growth this year, 9 inches.

Abies polita, 2 feet, a perfectly distinct and beautiful growing tree, which attracts great attention from its robust habit; leaves, bright green, standing out boldly; very hardy; will make a good lawn plant; growth this season, 6 to 9 inches.

Cryptomeria elegans, 7 feet high, thoroughly distinct from any other Cryptomeria in cultivation, and exceedingly hardy. It forms a truly graceful, compact-growing tree. The foliage is a fine glaucous green in summer, changing in winter to a light foxy brown, or plum colour, which again turns green in spring. This tree will become a general favourite and be extensively planted when better known; growth this season, 12 to 18 inches.

Juniperus japonica aurea variegata, 2 feet high, a deep golden variegated Juniper growth, like chinensis; very hardy and unique in its appearance; growth this season, 6 inches.

Juniperus rigida, 4½ feet high, very distinct from any other kind; light-brown drooping branches; growth this year, 6 to 9 inches.

Pinus densiflora. A distinct, fast-growing Pine, somewhat like austriaca, but of a lighter foliage; the timber is said to be much used by the Japanese; growth from 12 to 18 inches. It attains the height of 100 feet.

Pinus koraiensis, 3 feet high. A slow, compact-growing tree; habit and colour midway between P. excelsa and P. monticola; very hardy; growth this season, 6 inches; will attain 30 to 40 feet in height.

Retinospora filicoides. A new and most beautiful, distinct, hardy kind; the foliage is a rich bright green, very dense, and of exquisite fern-like character; growth this season, 6 to 9 inches; attaining 20 feet.

Retinospora filifera, 4 feet high, colour of foliage like pisifera, but with thoroughly distinct habit, having long, slender, whip-like shoots, from 10 to 12 inches in length, giving the plant a very graceful and elegant character; attaining 20 feet high.

Retinospora (*Chamæcyparis*) *lycopodioides*, 5 feet high. A slow-growing, compact tree, with dark green shoots, resembling a Lycopod, which name it bears; a very distinct, hardy Conifer; growth this year, 6 inches.

Retinospora (*Chamæcyparis*) *obtusa*, 9 feet high. A distinct, bright, almost emerald green foliage; of close, compact, graceful, free-growth, and pyramidal shape; a pretty lawn plant. This is named by the Japanese "Sun tree." The wood is used by them for all general purposes; attaining the height of 80 feet; this year's growth, 9 inches.

Retinospora (*Chamæcyparis*) *obtusa aurea*, 5 feet high. A golden variety of obtusa which retains its colour throughout the year; a very striking tree for planting on lawns; perfectly hardy, and of graceful habit of growth, branches spreading; this year's growth, 9 inches; attaining 40 feet high.

spora (*Chamæcyparis*) *obtusa aurea* eet. This is distinguished from the g kind, from its being a deeper olour, with close compact branches. nquestionably the brightest golden grown, and no doubt will supersede len Yew, being a much faster grower; 9 inches this season.

spora (*Chamæcyparis*) *obtusa pyra-* 2 feet. A very close, compact, owing kind; similar in appearance a aurea, but with a very bright green growth, 4 to 6 inches.

ospora (*Chamæcyparis*) *pisifera*, 9 feet Quite distinct from obtusa; having nder branches, greyish foliage, under uite glaucous, very hardy, and grace- t; growth, 9 inches.

ospora (*Chamæcyparis*) *pisifera aurea*, high. The foliage of this is soft, llow, with close compact growth; best in sheltered situations; average 4 inches; somewhat slow growing, favourable positions, a very pretty

ospora (*Chamæcyparis*) *plumosa*, 5 feet A perfectly hardy and beautiful tree, ry glaucous dissected leaves; compact graceful habit, which commands general admiration; growth this year, 6 inches.

Sciadopitys verticillata (Umbrella Pine), 4 feet high, with fine large bright green leaves growing in whorls, assuming in autumn the umbrella shape, and of a beautiful conical form. This species does well in any soil that is drained, and is unquestionably the most distinct and desirable Conifer of recent introduction, attaining the height of 60 to 70 feet; growth this year, 9 inches.

Thujopsis dolabrata, 4½ feet high. A dark green branching plant, of remarkably distinct character and bushy habit. It starts freely into a leader when well established in the soil; a pretty plant for lawn; growth, 9 to 12 feet.

Thujopsis Standishi, 4½ to 5 feet high. A very distinct Arbor-vitæ, with pendulous branches, light green colour, very hardy; growth this season, 9 inches.

Thuja pygmea, 1½ foot high. A very dwarf, quaint-looking Japanese plant; very useful for rockeries, &c.; very hardy.

Torreya nucifera, 4 feet high, *syn. Podocarpus*, and *Taxus*, the Japanese Yew. A robust-growing kind, with dark green foliage, and habit of the Irish Yew; growth this year, 4 inches.

The Dairy and Poultry-Yard.

MILK AËRATION.

IN reply to a correspondent requesting advice on the aëration of milk, the *Rural New Yorker* says:—

That milk, warm from the cow, is improved by having its particles exposed to the air, is now very generally admitted. We were the first to insist upon this principle, which was for a time questioned by dairymen, and the opposite taught, or attempted to be taught, by several distinguished speakers at the American Dairymens' Convention of 1867. Investigation and experiment have confirmed the principle announced by us years ago, that aëration in cooling the milk is an important element in securing good flavour and keeping qualities, and nearly all the late coolers try in some way to have the milk more or lest aërated. One of the recent inventions for this purpose consists of bellows and pipe for forcing air into the milk after it is deposited in the can. There is an arrangement by which pounded ice may be used in a box, through which the air must pass before it enters the bellows, thereby reducing it to a lower temperature than the surrounding atmosphere, as it is pumped into the milk. A pipe leads from the bellows to the bottom of the can, and through this pipe the air is forced, and thus is constantly passing through the milk while the machine is kept in operation.

In regard to the effect produced by forcing air through the milk as above described, Dr L. L. Wight, a factoryman of long experience and deservedly high reputation, states, in his address at the Dairymens' Convention of 1872, as follows:—"I have lately found that the forcing of atmospheric air into and through milk, thoroughly, has a wonderful purifying and preservative influence. Should every dairyman, besides thoroughly taking all the usual precautions which every one advocates, aërate his milk well before taking it to the factory, it would increase both the quantity and quality of his cheese at least one-tenth during the warm weather, and thus add one-fifth to his income. Were all the patrons sending milk to a factory to conform rigidly to these rules, a forty-cow dairy thus conducted would produce as large an income as that of a fifty-cow dairy managed as they ordinarily are. This, at an average allowance of 40 dols. per cow, increases his income 400 dols. during the season."

The question of aërating milk we deem an important one and the machines invented for the purpose appear simple and are cheap. Very likely they may be improved, but we can assure our correspondent that the principle of aëration of milk, both by forcing air through it in the way described, and by the use of the Arnold ventilator attached to the carrying can is well founded, and may be relied upon as advantageous.

CHEESE AS AN ARTICLE OF DIET.

IE following highly interesting article
appears in the *Albany Country Gentle-*
—

wish we could induce people to eat
heese. Few seem to appreciate the
ny of this article of diet, and probably
jority of cheese eaters take it in small
ties merely as a relish or condiment,
t as one of the staple articles of food.
partly the consequence of ignorance
very nutritious nature of cheese, and
the consequence of custom, for fashion
is our food much as it governs our

Our English and Dutch ancestors
ry much more cheese than we do, and
descendants still remaining in the old
, continue to eat much more than those
erica. In view of these facts, we pro-
o give the analysis of cheese, the part it
in the animal economy, and its value
red with other articles of food, and
if possible, aid the producer in finding
e market, and the consumer in obtain-
heap and nutritious article of diet.

a little difficult to give the component
of the average cheese, as the milk of
nt breeds of cows, and of the same
t different seasons of the year and with
nt food, varies so greatly in its compo-
and the process of manufacture also
. Thus the milk of the Jersey cow
ds in cream and is deficient in casein.
ese, therefore, made from Jersey milk
e rich in oil. On the other hand, the
f the Holstein cow, improperly con-
ed in this country with the Dutch, has
usual supply of casein and compara-
little cream. A cheese made from
ein milk will shew the same preponder-
of casein as does the milk. The manu-
er also sometimes uses new milk, some-
takes off the cream that rises in the first
e hours, more rarely takes off the cream
enty-four hours, and more rarely still
the cream that rises in the night to the fresh milk of the morning. The last process makes a cream cheese; the first, the common cheese of our factories, what the English call Cheddar cheese, rich enough for the king or the president. When the milk has been thoroughly skimmed, it then makes a white-oak cheese, hard enough to be used as a cart-wheel, but still rich in casein, and a very nutritious food and quite palatable when grated. Johnston, in that admirable book, "The Chemistry of Common Life," gives the following analysis of

	New-Milk Cheese.	Skim-Milk Cheese.
Water	36	44
Casein (curd)	29	45
Fat	30½	6
Ash	4½	5
Total	100	100

It will be seen that the three nutritious constituents of both these kinds of cheese are casein, fat, and ash. The first is highly nitrogenous, and goes to form muscle, very identical in its chemical properties with the gluten of wheat or the albumen of beans. Indeed, it is the highest type of food. The second constituent, fat or butter, is mostly carbon, and goes to the production of animal heat in the process of respiration, closely resembling the process of combustion. Butter acts on the animal much as does starch or sugar or gum or oil. It is simply charcoal in another form, and in the process of respiration, by uniting with the oxygen of the air, produces heat, as charcoal does in combustion, the final results in both cases being carbonic acid and water. Butter, therefore, though being more generally palatable than cheese, is a lower type of food. The third constituent of cheese, ash, or the inorganic part, though small in quantity, is very important, going to the formation of the frame-work of the animal, and consisting chiefly of the phosphates, chlorides, sulphates, and carbonates of alkalies. There may seem to be no connexion between the sowing of wood ashes or bone dust on our pastures and the quality of the cheese made from pastures thus treated, but it will be found that the white clover and other rich forage, which the ashes and bone-dust bring in, will make nutritious milk, and consequently nutritious cheese.

The great value of cheese as an article of diet may be better understood by comparing its compostion with other articles of food. That able chemist, Johnston, gives the following table, shewing the comparative values of

	New-Made Cheese.	Lean Beef.	White Bread.
Water	36	75	45
Casein (fibrin)	29	19	6
Fat	30½	3	1
Starch, ash, &c.	4½	3	48
Total	100	100	100

It will be seen that so far as fat is concerned, beef has three times as much as bread, and cheese ten times as much beef, and so far as muscle-forming constituents are concerned, beef is three times as valuable as bread, and cheese once and a-half as nutritious as beef. Taking everything into consideration, it is usual to compute 1 lb. of good cheese as equivalent in nutrition to 2 or 2½ lb. of lean beef. As cheese costs only about half as much as beefsteak, it can easily be seen how economical an article of diet it is.

The great defect in cheese as food is that there is not any starch in it. This defect is remedied by using it in connexion with bread, an article which abounds in starch Hence the custom of the English labourer, dictated by nature and confirmed by science, of eating bread and cheese for his luncheon while working in the field. Cheese alone is too concentrated an article of food. It taxes the digestive powers too much. While yet in the form of milk, cheese is in a state of solution in the 88 per cent. of water which milk contains, for though casein is insoluble in pure water, it readily dissolves in water containing some alkali, and milk contains just soda enough to keep in solution the casein. No food is so well adapted to the young of all mammalian animals as milk, which in the case of cow's milk contains only 4½ per cent. of casein, or pure cheese material.

Still, cheese is used by some as a promoter of digestion, and very properly when it is old and the process of decomposition is commenced. Connoisseurs sometimes prefer cheese in which the inferior form of vegetable life, commonly called mould, has begun. If cheese aids digestion, as it doubtless does when old or mouldy, it is on the principle that it contains the seeds of decay which it communicates to other food in the stomach, just as one rotten apple communicates decay to all that are in the barrel. The celebrated Roquefort cheese of France is cured in damp caverns, where the mould quickly grows, and the Italian practice is a similar mode of curing. If cheese is new it can only add an additional tax on the digestive powers.

CANKER IN FOWLS.

A CORRESPONDENT of the *Rural New Yorker*, being solicitous of information regarding a disease which had attacked his poultry, the following reply was elicited from Mr E. A. Rowe, Tremont, N.G. :—

The disease is *canker*, which affects both the throat and eye, and, if not speedily checked, eats its way inward to the brain. It first appears (generally) in the throat, though sometimes I have seen the eye attacked and the throat remain perfectly clear through the whole disease. The eye first commences to swell, and waters quite freely for a day or two, the swelling increasing all the time, sometimes reaching the size of a small walnut ; upon being opened, it is filled with a hard yellow matter, which is very offensive.

I have found this easily cured by bathing the eye with tepid water and vinegar, letting it run well into it, and then squeezing lightly around the eye, which loosens the matter from the skin ; by drawing the lid back and pressing outward the whole mass can be taken out in a ball. I have had cases where the fowl recovered entirely in three days, only being obliged to squeeze out the substance once ; others have been of longer duration, where I have been obliged to scrape out around the eye for many weeks (once or twice a-week) with the ear end of tweezers. In one instance I was obliged to remove the entire eye from the fowl. I have never lost a fowl from the disease yet. Diluted carbolic acid is also very beneficial to cleanse with after the substance has been removed.

Taken in its early stages, there is no trouble to cure it. The fowls, of course, should be separated from the rest, as it is contagious. I have never known *one* to have it without others following soon after.

CORN V. *ROOTS FOR MILCH COWS.*

A CORRESPONDENT of the *Albany Country Gentleman* communicates the following experiments made with a view to ascertain the relative profits to be derived from root and corn feeding :—

For two or three years previous to 1870 I had raised large crops of roots, principally carrots, to feed to a dairy of some twenty cows during the winter months, and I thought then, as now, that they were of great value to the cattle, improving their condition and flow of milk. I however found that they were an expensive and bulky crop, and in cold weather troublesome to cut and feed. They could not be grown for less than 25 cents per bushel. As corn could be bought for 75 cents, I determined to experiment with the two kinds of feed and also both fed together, feeding the same money's worth of both, that is, one-third as much meal as roots. I therefore stabled together, on the 7th of March 1870, three heifers selected as being at that time as nearly equal in condition and flow of milk as any in my dairy, and fed as follows :—No. 1 with 2 quarts of corn meal, twice daily. No. 2 with 2 quarts of corn meal in the morning and 6 quarts of roots (carrots and turnips), cut fine, in the evening. No. 3 with 6 quarts of the same roots twice daily—care and other conditions the same. On beginning to feed, No. 1 yielded 3¾ pints of milk ; No. 2, 2¼ pints, and was in a little the best condition ; No. 3, 3¼ pints, and in about the same condition as No. 1. These measurements all taken at night's milking. On the 11th of April, No. 1 gave 4 pints, and had taken the most flesh; No. 2 gave 2½ pints; No. 3, 2¾ pints. Both Nos. 2 and 3 had improved in flesh. It will be seen that Nos. 1 and 2 gained in milk a trifle, while No. 3 lost. I was not satisfied with this experiment, particularly as I discovered that No. 1 was not with calf, while the 2 others were getting heavy; I therefore made a selection of three other cows. April 11th, No. 1, three years old, 10½ pints night's milking—4 quarts of meal per day. No. 2, four years old, 9¾ pints—2 quarts meal in the morning, 6 quarts roots at night (carrots). No. 3, six years old, 9 pints—2 quarts of carrots per day. All three two months in milk—care and other conditions the same. On the 11th of May, before turning to grass, No. 1 gave 13¾ pints. No 2, 11 pints. No 3, 9 pints.

Now, I do not wish to discourage the raising of roots, for an occasional feed of roots through the winter can be given to advantage. But these experiments convinced me that there was greater benefit to be had from feeding corn meal to cattle, whether cows in milk or other, to say nothing of the much greater conveinence in feeding. My conclusion, therefore, is that it is better to buy or raise Indian corn than to attempt the cultivation of roots to any extent in this climate.

The Veterinarian.

HORSES OUT OF CONDITION.

E past winter has seriously affected
all kinds of horses much employed
ome, internal organs being impli-
more or less, in a state of conges-
e lungs and liver probably suffer-
most. These being so intimately
ed in the purification of the blood,
en diseased, to perform their func-
properly; therefore, through this
he blood, becoming less and less rich
itive elements, as well as being liable
charged with a greater amount of
ies, which, from general functional
r are not passed out of the system,
le to nourish the body as it should.
t disappears, the muscles waste, the
t does not move off at the usual time,
nal becomes lank in appearance, his
ses firmness, and eat what he may,
ovement follows.

ave known all these results to arise
stupid practice of carters persisting
g the horses under their care with
drugs, especially saltpetre, during the
d wet weather of winter and the spring

not always an easy affair to prescribe
als in the state under consideration,
ing a general view of the matter as
ed, we should recommend any of
ders whose horses are "out of con-
to adopt the following means, sub-
course to existing circumstances:—
the ordinary food for three days, a
e quantity of bran—say 2 lb. per
d on the evening of Saturday, when
es return from work, give to each, as they can be spared, 1 pint of linseed oil and 1 oz. of sweet spirits of nitre. Let this be administered carefully, and face, lips, &c., thoroughly cleared of all portions that have run over them during the operation. A sponge and warm water, having a teaspoonful of common washing soda dissolved in it, will secure this effectually; and if the parts are afterwards dried with a soft towel, the animal will feel comfortable, and resume his food all the sooner.

In one hour a mixture of bran and scalded oats may be given, and for drink a pailful of oatmeal and water, or hay tea, not quite cold. Make each animal comfortable in the stable, and next morning, if the bowels have not acted, take the animal out for a ten minutes' *walking* exercise, and supply during the day, only small quantities of the usual food, taking care none is left before him that he will not eat. Work must not be resumed until the bowels have regained their proper state, which, being accomplished, give in the provender, each morning for a week a large teaspoonful of the following mixture.

R.

Powdered Gentian	**2 lb.**
" Ginger	**1 "**
" Sulphate of Iron	**1 "**
" Carbonate of Potass	**1 "**

This mixture, although apparently large will not be too much for ten or twelve horses. Those who do not possess so many, will need to reduce the quantity to three-fourths, one-half, or one-quarter, as required.

In the way of diet a few carrots, or a small quantity of linseed mucilage added to the usual provender daily, in the evening, may be found beneficial; but for minute particulars on this essential department, we refer our correspondent to the "Horse-owner and Stableman's Companion," published by F. Warne & Co.

If the cough continues troublesome after the oil has acted upon the bowels, the powders must not be used, and in their place a mixture of the following medicines may be administered daily to each horse for a week:—

R.

Carbonate of Ammonia	2 drachms	thoroughly ground together.
" Potass	2 "	
Iodide of Potassium	1 "	
Extract of Hyoscyamus	½ "	

Mix and give in 1 pint of cold ale.

THE SHEEP SCAB.

By Mr Ferris, M.R.C.V.S.*

The scab in sheep is well known as a fearfully destructive disease of a purely local nature, due to an insect which induces irritation, suppuration, and encrustation on the surface of the body generally. It is a contagious disease, never originating spontaneously, and requires for its development the passage of the parasites or their eggs from diseased to healthy animals. In the horse and dog this disease is termed "mange;" in man, "itch." Though the weak, starved, ill-nourished condition of some animals renders them very liable to the disease, they only become affected when in contact with the infection. Wet seasons, starvation, and poverty cannot produce the disease any more than foot-and-mouth disease can be imputed to diet, pasturage, &c.; but in badly managed flocks in wet weather the disease spreads with great rapidity, burrowing in the skin. In hot dry weather the usual symptoms of the malady often disappear. This leads many flockmasters to a false conception that their scabby sheep are cured, whereas the complaint is more contagious than in cold weather, because the acari are more numerous on the wool, which are conveyed from one sheep to another either by actual contact, or by being left in locks of wool on trees, fences, or stones on which scabby sheep have rubbed, and with which the clean sheep afterwards come in contact. The insect which is left on the loose wool is very tenacious of life, and will live for months in a moist temperature, and there is no doubt but that sheep have received the infection from gates, and trees, &c., on which the acari must have existed for several weeks and even months after leaving the scabby sheep on which they were propagated. If one or more female acari are placed on the wool of a sound sheep, they quickly travel to the root of it and bury themselves in the skin. In ten days or a fortnight a little swelling may be detected with the finger, and the skin changes its colour to a greenish blue tint. The pustle is now rapidly formed; in a few days it breaks, and we have a nest of little ones, some travelling in one direction, some in another, but all going to commence business for themselves, in which they are generally successful. Their propogation is marvellously rapid.

Symptoms.—Light colour spots, or locks of wool sticking out from the fleece on the shoulders, back, ribs, or rump; marks of scratching with hind feet on the shoulder and neck. On watching sheep for a short time in which scab has existed for a fortnight, some of them will be observed to turn sharply round and bite or scratch themselves very suddenly and severely; the skin, especially on the shoulders and along the back, will be of a pale or bluish green tint, and will on those parts be gradually covered with pusules. The breaking and drying of pimples forms a scabby appearance; the affected parts on being handled will feel thick and hard—as the phrase is, "the skin is like the bark of a tree." The poor creatures are tormented with incessant irritation and itching, until they bite and rub the greater portion of wool off themselves; and if the flies are bad, they will get eaten up with the maggot.

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* Read before the Breconshire Chamber of Agriculture.

Treatment.—Nearly every farmer has his own receipt for the cure of sheep scab, and will tell you he can cure it at one dressing, whereas at the same time one-half of his flock is eaten up with the scab. Farmers keep their remedy too long in the house, or leave it at the druggist's shop, instead of applying it to the poor sheep. Every shepherd should make himself acquainted with the disease at the very first appearance, and at the slightest symptom the suspected animal should be separated from the remainder of the flock, well dressed immediately, and thoroughly confined until it is cured, and not let it break into strange flocks and affect them.

Dressings.—Decoction of tobacco is generally first in most of the receipts. No doubt it is as good as any, but when sulphur is mixed with it it has a more lasting effect. The sulphur is comparatively insoluble, adheres to the wool and skin, and as soon as fresh acari are born they are killed; with many the skin is left clear, and the parasites can again prey on it, the partial cure of scabby flocks being a great cause of the disease being perpetuated in a district. Tobacco and sulphur 1 lb. of each to 5 gallons of water make a good dressing. Long's specific will cure scab very readily when properly applied.

The number of flocks affected with scab, which have been reported under the Contagious Diseases (Animals) Act, since November 1870 to November 1871, is rather large. This county is notorious for scab, chiefly in connexion with the mountains. Number of reported and inspected places where scab has existed during the year, 224; total number of sheep belonging to the farms, 40,364, all more or less exposed to the contagion; number of infected sheep, 5813. Now, the loss on wool, mutton, and deaths, with expense of dressings, dippings, and labour, I consider to be no less than £20 to each farm. Taking one with another, the flocks average 180; the loss from the effects of scab which have been investigated during the year is therefore £4480. No doubt not one-half (I question if a-third) of the farms which have been affected with scab have been reported, and if that is the case—I believe it is—the loss from scab is double or treble, something like £10,000 to £12,000 a-year. You can put your own estimate on the damage to other counties. The provisions of the Contagious Diseases (Animals) Act, if properly carried out, might lead to the extermination of scab, and even arrest the spread of other contagious diseases; but it is only by the willing co-operation of all who are concerned that any legislative enactment in relation to the prevention of disease can effectively be carried out. The police cannot do it, neither can the inspector. We want the assistance of the farmers, and it can be done and done effectually. We are instruments by which the flockmaster can stimulate his neglectful neighbour. By an Order of the Council of August 5, 1871, power is vested in the local authority, by which it may make regulation for prohibiting any person having in his possession or under his charge a sheep affected with sheep scab without treating that sheep or causing it to be treated with some dressing or dipping, or other remedy for sheep scab. Also for prohibiting or regulating the movement out of any field, stable, cowshed, or other premises in which sheep scab has been found to exist, of any sheep that has been in contact with, or in the same field, stable, cowshed, or other premises with any sheep affected with sheep scab, and for cleansing or disinfecting sheds and places used affected with sheep scab. He thought that the sheep scab was one of the most important diseases among live stock demanding the attention of the farmer. For example, the foot-and-mouth disease was not so thoroughly understood as the scab, which was a disease which did not originate in any other way than by contagion.

The Apiarian.

ARTIFICIAL SWARMING.

A CORRESPONDENT inquires if two artificial swarms can be made from the same stock in one season. Much will depend upon the season, and much upon the stock itself. We have made three and four good stocks from one during the season. In the first instance, we divided a good strong stock, afterwards divided the old stock again, and the one had made from it, making altogether four stocks. If a stock is strong, and the combs well filled with young brood early in the season, and the honey harvest continues good, it may be safely divided more than once.

Our readers will understand that when a stock is properly divided, the old stock is deprived of the queen and a large majority of the bees, much in the same manner as when a natural swarm issues. It will therefore be several days before it has another laying queen and the combs be filled again with young brood, and until such is the case it would not be well to divide. The swarm made from the stock will frequently require to be divided again, as it has the old queen; and if she be prolific and the honey harvest good, the hive will soon be filled with combs, and the combs filled with brood and honey; and if the stock is not divided, or extra room provided, they cast a swarm. No bee-keeper should attempt to make artificial swarms who does not understand the nature and habits of the bees, or has not some reliable work to guide him in the operation.

Frequently, from want of knowledge, or following the directions given by some novice, great blunders are made, and the science of bee culture is pronounced at fault. In a small pamphlet printed in Sarnia, describing a hive patented by George Otts, there is a plan given for making artificial swarms, which, if followed, would surely ruin an apiary. The writer says :—"Raise off the honey board, and take out carefully about half of the combs, with the bees attached to them, and put them into the empty hive. The combs should be placed in the middle of each hive ; fill out the outside with empty combs or frames." No worse method could well be adopted. No feature of it is in harmony with their habits. The writer appears to be aware that the "division" which happens to be without a queen will build drone comb, which would be ruinous to the stock, and he therefore advises that all such combs be removed and used for storing surplus honey in, seeming to forget that while the bees are building this drone comb the honey harvest and season for breeding is passing away, and in many cases would be past before the bees could rebuild worker combs in the place of those removed. We would warn all bee-keepers against following any such plan. That which approaches closely to natural swarming is by far the nearer to right. The hive also described in this pamphlet has several serious objections, and no feature of it can possibly be covered by a patent which is of any real utility. But more of hives anon.—*Toronto Globe.*

The Naturalist.

ENGLISH SALMON FISHERIES.

TO those who have not had the opportunity or taken the trouble to inquire to the present condition of our rivers and e effects of recent legislation, the announceent of the yield of fish having vastly ineased may appear unsupported by the fact at salmon has brought during the present year high a price as ever in the London shops, hile the frequency and urgency with which nended fishing legislation has been before e House of Commons would imply that the esent system of river management has not en attended with success. A perusal of the nual report lately issued by the inspectors, r Buckland and Mr Walpole, will, however, spel these doubts, and prove to the reader at the price of salmon in the London marets (kept up, doubtless by a combined rangement between the takesmen and venr) is no test whereby to calculate the imovement or deterioration of our inland aters as fish producers; nor is the continued y for reformed fishery legislation any cririon whatever of the efficiency of existing cts. The inspectors tell us, says the *Pall all Gazette*, that the increase of salmon since e present Acts were passed has been astoshing; a remarkable improvement taking ace in almost every district since the ar 1861, until last season when the value the salmon captured in English and Welsh ers, which some nine or ten years ago was timated at £18,000, could not have been ss than £100,000, and may in all probality have amounted to £150,000. These ures represent the take made by the net en. Although an improved take to the roods s reported last season, anglers so far have rived little benefit from the general increase. f the rivers which have contributed to this total, the Tyne comes first where 121,600 salmon were captured during the season; the Severn next, with 16,870 salmon; the Ribble third, with 10,412; the Wharfe, 2211; and so on. Some of the more important districts have not, unfortunately, furnished the inspectors with any returns as to the fish taken. The Dee Board, for instance, while giving full particulars as to the number of prosecutions instituted, licence duty paid, &c., are unable to forward any return of the salmon taken, as the fishermen refuse to supply information on that point. The Tees conservators fail to furnish any information whatsoever—a strange omission, considering that the Bill brought in by Mr Dodds, one of the officers of the board, contained, if we mistake not, a clause making it compulsory for all boards to furnish annual reports.

Mr Buckland, whose prophecy that last year would "be a culminative one for salmon," has not happily come to pass, tells us that the improvement in our fisheries is attributable to preservation, construction of fish-passes, and diminution of pollution. To the two former the entire increase may doubtless be traced; for pollutions appear from the report to be as rife as ever; neither boards of conservators nor fishery inspectors being able to cope with the evil, which, unfortunately, is not sufficiently provided for in the Salmon Acts. Poaching, too, appears in some districts to be very prevalent. It is satisfactory, however, to learn from Mr Walpole that out of the 432 prosecutions instituted during the year for offences against the Acts, 345 convictions were obtained, and moreover, that magistrates appear to shew more readiness than formerly to deal with offenders according to their desserts.

We have touched but briefly on the interesting matter contained in the inspectors' report. Mr Buckland enters minutely into details regarding each river visited by him during the year, and offers valuable suggestions for overcoming various difficulties to river restoration: while Mr Walpole goes more generally into the subject, presenting us with important calculations and statistics as to the value of the fisheries and the number of men employed in a field of industry which is becoming of more importance, not only in augmenting the food supply of the country, but in widening the area of remunerative labour.

We trust the Select Committee who are at present deliberating on what changes are necessary in existing Acts will carefully read the report, and that while arranging for a more elaborate machinery of river management, which we contend is unnecessary, will recollect that the prosperous condition of our salmon fisheries has been brought about under the working of a very simple system, and that the constitution of boards of conservators, form of licence duties, and other matters at present engaging their attention, are of secondary importance to the removal of pollutions and securing a free passage to the salmon from the sea to the spawning beds; the prevalence of the former and the absence of the latter being at present the two great drawbacks to the improvement of our salmon waters.

The Country Gentlewoman.

IVY FOR HOME ADORNMENT.

THERE is no other plant that produces so pleasing an effect as a luxuriant English or Irish Ivy trained over the walls of a living room, framing a door or a window; draped about brackets, statuettes or pictures. It is the most graceful setting that can be procured, and will adorn the most common surroundings, rendering a plain room lovely and attractive. Placed in a hall, it will beautify and ornament it wonderfully. Trained in festoons over a stiff, straight window frame, it will change its appearance like magic.

There is no plant which will strike root more readily, and large trailing plants 9 or 10 feet long can be purchased at any of the nurseries.

For a room, place the stems in small bottles of water and hang the vials behind a picture frame, wreathing the leaves and branches about it. A rustic frame is better adapted to this adornment, as the stems can be more readily attached to it; yet a gilt frame looks very pretty when enwreathed with the bright, glossy foliage. If the picture frame is large, a pot can be made of zinc, and shaped like a wedge, of such dimensions as will readily fit between the wall and the frame, and it can be caught or fastened upon the picture frame so as to be quite concealed, while the Ivy can be gracefully trained over the frame; but one must be sure to keep it filled with water, and put two or three bits of charcoal into it to keep it sweet, while a drop of aqua ammoniæ added once a-week will increase its growth. If the space between the wall and picture is large enough to admit of a wedge-shaped pan of 8 inches in length, and 3 or 4 inches at the top, it can be filled with rich soil, and the plants will grow and flourish, although no sunshine touches the roots, and send out long tendrils that will twine lovingly about the frame. There are many ways of growing the Ivy; large branches can be put into glass vases, which must have bits of charcoal, and a little stimulant of aqua ammoniæ weekly, and they will strike tiny white roots away down into the water, and throw out delicate green leaves from the upper branches, which can be trained around the mirror, over the mantel-piece, or twined around statuettes placed upon brackets on the wall.

For hanging baskets it can be made very available; by filling the basket with Moss, and placing five or six small bottles of water among it, with a branch of Ivy in each bottle with water, charcoal, &c., a very handsome appearance can be obtained; and if pressed Fern leaves, mingled with bright hued autumn leaves, are interspersed between the Ivy branches, which can be made to twine up the chains or cords which suspend the basket, the effect is really lovely. Each evergreen, heart-shaped, bright, glossy leaf, with its rich veining and shading, becomes a beauty, and well deserves the care it will demand at your hands; for if the basket is deep, you need fill up the small bottles or vials but once a-week, but be sure to use warmish water when it is given.

When the room is to be swept and dusted, pin a newspaper over the leaves, and they will keep fresh and clean; but it is needful to sponge them off once in a while, for if the pores are clogged with dust, there can be no healthy life in them.

Such a basket is most easily prepared, and will be a decided ornament to every room, while it demands but very little attention. Ivies do not thrive as well in strong, bright sunlight, but prefer a shady place—would rather shun "the garish eye of day."

They will grow finely in the farthest corner from the windows. A large pot can be placed on a stand far from the window, and it will twine its flexible branches all about the wall and cornice.

The stems and branches can be fastened to the wall paper and the cornices of the room by small pieces of green worsted braid, tacked around them with silvered tacks. These can be easily removed, when it is desired to transfer the Ivy to the verandah or porch, in the summer, or when the semi-annual house-cleaning demands its removal.

Ivies will endure any amount of neglect and still live; yet they repay the careful cultivator by a much more rapid and vigorous growth. The soil should be prepared with reference to the growth of wood and leaf, yet not too rich, as long lanky stems, with leaves few and far between, do not accord with our standard of beauty. A good soil is composed of one-half good loam from a garden, and one-half of leaf manure and sweepings mixed; well decomposed tan is also very good for them. For growing in pots, set the plants into large porous clay pots, rather than ornamental pots that are glazed, as they do not admit of evaporation from the sides, and are not as healthful for any plants, though Ivies will grow better in them than either Roses or Geraniums.

Ivies do not like a warm, close atmosphere, but will flourish far better if kept in a cool hall or upper chamber. Indeed they will bear a chilly air without injury; and even if the soil slightly freezes, they will not complain by one drooping leaf. They also like much moisture, will bear wet feet far better than most plants, and also require stimulants to grow finely. Plants raised from cuttings do not make much headway until they are two years old; then they will commence to shoot forth new branches, and continue to do so every year. Their life is of long duration. No one knows how old are the Ivies that adorn the ruins of England's antient castles; hundreds and hundreds of years have passed since they began to creep "o'er ruins old." The Ivy will strike root from every joint, and is easily propagated by layers from an out-of-door plant, as well as from cuttings.

The German Ivy is not properly an Ivy, but belongs to another class. Its growth is much more rapid, and it will soon become a large plant. It will also grow easily in water. The tops of the long champagne glasses which have been broken from their standards, can be used instead of vials for growing Ivies, and if placed in rustic holders made of tiny Spruce boughs interwoven together, after their needles have fallen, the effect is very pleasing.

If a home has not some pretty things about it, some of the "green things of the earth," it cannot be in the highest degree pleasant. To make it beautiful it requires the evidences of taste, culture, and refinement, and there are no greater helps to home adornment than the clustering Ivies which tasteful fingers can twine around the sitting room windows, over the cherished pictures, and across the mirror.

Try their effects, fair friends, and thus learn to appreciate their value.—*Daisy Eyebright.*

PRIMROSES AS WINDOW PLANTS.

HINESE Primroses afford more satisfaction for the little care they demand an any plant of which I know for the winow—troubled by no insect, and continually bloom. I have two plants that have oomed through their third winter. They e now 3½ feet in circumference, their large endant leaves nearly obscuring the pots, aking beautiful objects for brackets each de of the window. I have counted a hunred blossoms open at once on one plant. hey are the P. macrophylla. I have tried everal other sorts, but these are far superior.

The Double White English Primrose is articularly valuable as a window plant, as it oes not suffer so much for the want of full ight as some plants do. To be sure it does est with an abundance of light; but some hings must have this or nothing comes of hem. Then the flowers are so fragrant. In ny taste the Violet is not more grateful than he smell of a good Primrose. As a bouquet flower it is equal to the best. The pure white flowers are always welcome, and then they already have somewhat long stems, and need little tying to twigs to get them of proper length. One after another, too, flowers come into succession. It is, moreover, a plant of very easy culture. The worst time is the summer, but I put all my plants out of pots, and set them thickly together in a box of rich earth in April, and set the plant box out under a cool shady wall till autumn, when they are divided into as many as I can make, and potted into 4-inch pots, with very rich soil, and then keep them in a cool frame till wanted for flowering. As they never produce seed, they are scarce, because there is no way of propagating but by divisions of the roots; but I am sure if the public who like window and bouquet flowers only knew what a little treasure it is, there is little doubt that nurserymen would soon get up enough plants for them.—*L.*

HOUSE CULTURE OF HARDY PLANTS.

A PLANT may be perfectly hardy and still be one of the very best for house ulture. Our florists have, within the past ew years, taken a "new departure" from he old beaten path of growing only tender lants in their greenhouses; and now it is hose species that make the best show withut regard to habit that are most sought fter. Hardy herbaceous plants of various inds, such as Spiræas, Phloxes, Saxifragas, nd also hardy shrubs like Deutzias, Weigelas, nd Daphnes, both evergreen and deciduous, re now forced under glass in immense uantities. There is one thing, however, hich is bad for purchasers who do not keep themselves informed as to name and history of these plants, and it is that they are often misled in supposing that because they find them grown as tender plants they are so in reality. I have often seen persons buying the little Deutzia gracilis in full bloom, as it came from the greenhouse in spring; and supposing from this circumstance that the plant was tender, they kept it in the pot all summer instead of planting it out in the garden after the flowers were gone. It is an old saying, that "A man is known by the company he keeps," but this will not apply to the plants grown most extensively by florists at this day.

In filling my greenhouse I am endeavouring to make as many departures from old lines as possible for the sake of novelty, and the woods and swamps yield me some choice specimens. For instance, there is no more beautiful little ornamental plant for window or conservatory culture than the common Cranberry; its flowers and leaves are extremely delicate in appearance and the fruit ornamental. And there are scores of little dwarf evergreen plants like the G pubescens, with its white, reticulated For an evergreen trailing plant we c few that will equal the variegated Pa Berry (Mitchella repens) with its p white flowers succeeded by brilliant edible berries. In fact, our woods an abound with choice plants worthy of culture, and any conservatory might b with home novelties without recourse tof

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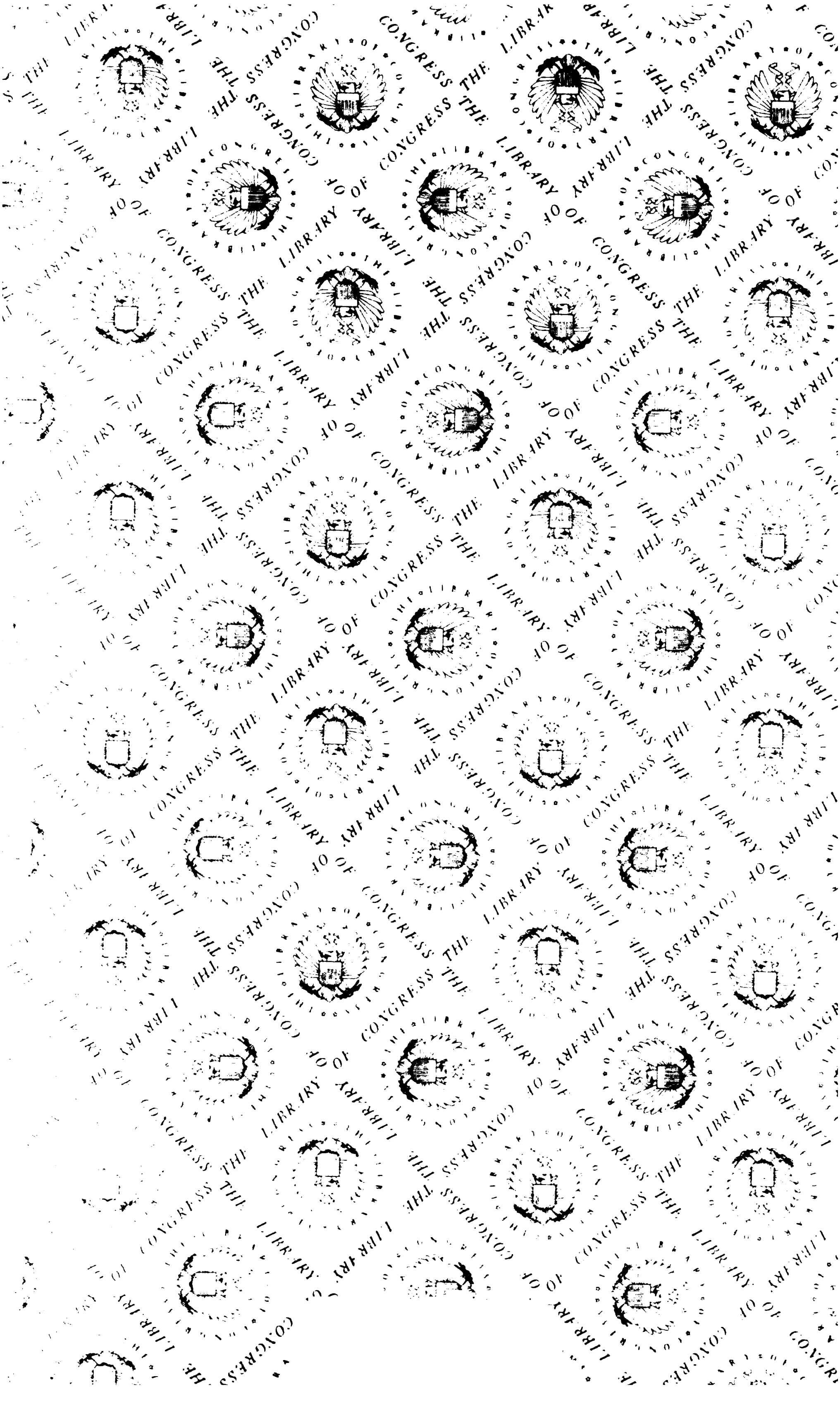
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